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PHYSIOLOGY OF THE STOMACH.*

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One hundred years ago, Dr. William Beaumont,[1] an army surgeon at Fort Mackinac, published his famous work on gastric digestion. So important were his contributions that on October 5th, this year, the New York Academy of Medicine commemorated the 100th anniversary of his notable publication. It would seem, therefore, that the Medical Society of Virginia, in holding its symposium on diseases of the stomach has selected a time most appropriate for the occasion.

The conquest for broader knowledge of the workings of the human body and its various organs is exemplified in the publication of Dr. Beaumont, and by way of tribute to this great pioneer of medicine a brief mention is made of the incident which led to his celebrated and uncontroversial observations.

A young French-Canadian boy, Alexis St. Martin by name, had been accidentally shot in the abdomen, the bullet perforating the musculature of the stomach. Dr. Beaumont was called to treat the case, and in spite of all his efforts the wound would not heal, but left a fistulous opening in the abdominal wall through which gastric contents would escape. For two years he cared for and attended the patient in his own home without success; then realizing an opportunity for some important observations, he began his studies, continuing them over a period of eight years; actually watching the stomach at rest and at work. He observed the types of foods that caused the gastric juices to flow; what foods were easily digested, and what foods retarded the digestive processes; how long certain diets remained in the stomach, and the length of time necessary to digest a normal meal. His observations are recognized as one of the great classics of medicine, and have brought to their author undying fame.

*Read as part of the Symposium on Diseases of the Stomach at the sixty-fourth annual meeting of the Medical Society of Virginia, in Lynchburg, October 24-26, 1933.

Since the epochal work of Beaumont, much has been written on gastric physiology, and the scope of our information on the various phases of this subject is so broad, that to give a detailed and elaborate presentation on the physiology of the stomach is both time consuming and impractical. The best that can be hoped for is a brief consideration of some of the clinically important features of gastric physiology.

Not until Hemmeter, 1896, and Cannon, 1898, advanced a method for studying the size and shape of the stomach in living human beings by means of X-rays, was its true shape and position known. The normal position of the stomach was then found to be somewhat at variance to the classical anatomical description as ascertained from cadavers. After the ingestion of a barium or bismuth test meal, the shape of the stomach is found to conform closely to the letter "J", the fundus and cardia occupying a more or less vertical position, while the pyloric antrum is practically horizontal. The division of the stomach into these two main parts is usually accentuated by the prominence of the incisura angularis on the lesser curvature. This division of the stomach is also intimately connected with certain phases of its physiology.

Within a few minutes after the taking of food, activity in the stomach begins. The multitude of small branched tubular glands, which make the greater portion of its mucous membrane, begin to pour forth their secretion. As the mass of food accumulates, it is penetrated with difficulty by the gastric juice, and thus affords time for the food, which has been previously mixed with saliva, to undergo partial carbohydrate digestion. The conversion of starches to maltose and dextrin by the pytalin of the saliva causes the food mass to liquify and thus facilitates the action of the gastric enzymes.

It has been shown that the epithelial lining of the

stomach, and the glands in proximity to the pyloric and cardiac orifices, secrete a fluid containing mucin, with little or no enzyme activity, and, therefore serves to lubricate the food and protect the stomach lining against irritating substances. The glands occupying the cardia, and particularly that portion of the cardia known as the pre-pyloric region, are endowed with the greatest activity, in so far as the digestion of food is concerned. Two distinct types of cells make up these glands: first, there are the chief or lining cells, whose function is to secrete the enzymes pepsin and rennin; second, there are numerous irregularly spaced cells, occupying a position more remote from the lumen of the glands. These cells are called parietal cells, and because of their acidophilic staining nature, are sometimes termed oxyntic cells. Their function is to form and secrete hydrochloric acid.

The enzymes pepsin and rennin are not secreted in their active forms, but as pro-pepsin and pro-rennin, and in order that they may exert their action it is necessary that they be activated by other substances. The substance responsible for the conversion of pepsinogen or pro-pepsin to the active form, and for the conversion of pro-rennin to rennin, is hydrochloric acid. In all probability, it is not so much a question of hydrochloric acid *per se*, but because an acid medium is essential for the action of pepsin. It would seem, therefore, that a large number of acids might effectively replace hydrochloric acid in this function; even the citric acid of orange or lemon juice might prove adequate substitutes. Comparatively recent studies seem to indicate that fruit juices can replace hydrochloric acid in the treatment of achylia, and are definitely less irritating, and certainly more palatable. Whether this substitution is justifiable or not remains for further investigation.

The formation of hydrochloric acid by the parietal cells is of great interest to the physiologist. It was William Prout, in 1824, who demonstrated that the acidity of gastric juice was due to this acid, and not to some organic acid as one might ordinarily infer, but even today the mechanism of its formation is one of the many mysteries of biology. By reason of analogy, Maly, in 1874, proposed a reaction by which hydrochloric acid might be formed in the glands of the stomach. It was suggested that the interaction or reaction of sodium chloride and carbonic acid can produce minute quantities of hydrochloric acid in a test tube, and this reaction might occur in the parietal cells of the stomach. The fact that these cells are continually removing the acid as it is formed would explain a greater concentration than can be secured from test tube experiments. It is also suggested that the hydrochloric acid is secreted into the lumen of the gastric glands, whereas the sodium carbonate is carried away by the lymph. The reverse of this condition is thought to occur in the pancreas, where sodium carbonate is secreted and the acid passes into the lymph. It is interesting to note that pure pancreatic and gastric juices approximately neutralize each other volume for volume.

Pure gastric juice may be obtained for study in several ways. Spallanzani would swallow a sponge to which a string was tied, and after it had absorbed sufficient gastric secretion, would pull it back and express the juice. The Russian physiologist, Pavlov, segregated a small portion of the stomach and formed a pouch which communicated with the exterior through an abdominal fistula. His experiments on conditioned reflexes, and psychic secretion of gastric juice are well known. Beaumont, in 1833, and Carlson in recent years, have carried out exhaustive studies on human beings with fistulae. For clinical observation, however, our procedure for obtaining gastric juice is quite simple. After a suitable test meal, a Rehfuss tube is passed into the stomach and the gastric contents removed as desired.

Pure gastric juice is a thin, watery liquid, colorless and strongly acid in reaction. The concentration of hydrochloric acid is about .4 per cent to .5 per cent, or approximately equivalent to a tenth normal solution. It contains a number of inorganic ions, such as sodium, potassium, calcium, magnesium, phosphates and carbonates. The most important organic constituents are the two enzymes pepsin and rennin. There is probably a small amount of lipase. Approximately two-thirds of the acidity of gastric juice is due to free or uncombined hydrochloric acid; the other third is loosely combined with protein. This high acidity is of some value to the body in destroying many pathogenic organisms that might otherwise invade the digestive tract. When the acid is low or absent, bacteria make their appearance. Among those most commonly observed is the Oppler-Boas bacillus, and hence the occurrence of these organisms may be of considerable diagnostic importance.

Pepsin in conjunction with hydrochloric acid brings about the most important digestive changes occurring in the stomach. So essential is the acid that the process should correctly be termed pepsin-hydrochloric acid digestion. When protein is subjected to the influence of gastric juice, there first occurs a formation of acid-metaprotein, which is subsequently split into primary and secondary proteoses. It is arbitrarily stated that the end point in peptic digestion is the formation of soluble peptones. No amino acids are formed except traces which probably result from acid-hydrolysis. Thus it may be said that, as a result of the action of pepsin, the large and complex protein molecules have been disscciated and broken down into much simpler molecules of peptones and albumoses. Probably about one-tenth of the total peptid linkage of the protein molecule has been severed in this way. This partially digested protein passes into the intestine where other enzymes, trypsin and erepsin, complete the digestive process by converting the albumoses and peptones into their constituent amino-acids.

The enzyme rennin was for a time thought to be identical with pepsin, or certainly inseparable from it. It is believed, now, however, that the enzymes are separate and distinct. Rennin when injected into the blood will produce an antibody; pepsin will not. The two enzymes can be separated from solution by means of a strong electric current, so that it seems fairly definite that in spite of the intimate relation of rennin to pepsin, and even other proteolytic enzymes, rennitic activity is not just a stage in the cleavage of proteins as was previously supposed.

The chief action of rennin is upon casein in milk, converting this protein into so-called para-casein, which interacts with calcium to form an insoluble curd. When calcium is removed from milk, or immobilized by sodium citrate, rennin exerts no visible action. The chief function of this enzyme would seem to be one of retarding the passage of milk from the stomach, thus ensuring more complete peptic digestion.

There may be other enzymes and hormones elaborated by the stomach, about which we have little information at present. Nevertheless, there is some indirect evidence of their existence which cannot escape more serious consideration. The relationship of gastric function to certain systemic disorders, notably pernicious anemia, has been known for some time. Within the past few years much light has been shed on this relation. In 1929, Castle observed that beeksteak which had been previously subjected to peptic digestion in a normal person was quite effective in treating pernicious anemia, producing the same response as liver extract. Shortly afterwards Sturgis and Isaacs (1930) found that dried hog's stomach was equally as potent as a liver preparation in combating this disease. Subsequent studies by Hemming and Steiger reveal that the mucosa alone is inactive in this respect unless fed along with meat. It is therefore suggested that another enzyme is present in the stomach which acts specifically on muscle tissue liberating the hemapoietic factor, and that this factor is stored in the liver. This intrinsic substance of the stomach, whatever its nature, is destroyed by heat, and would apparently indicate that it is more in the nature of an enzyme.

Many factors are involved in the elaboration of gastric juice. The mechanism whereby this is accomplished is both nervous and chemical. It will be recalled that the stomach receives its nerve supply from both divisions of the autonomic nervous system, the cranial portion, or vagus nerve, supplying both secretory and motor fibers. Other nerve fibers are derived from the true sympathetic by way of the celiac plexus. These latter fibers are both inhibitory to secretion and to the motor activity of the stomach, and therefore are diametrically antagonistic to the action of the vagal fibers. Thus there is established a balanced nervous mechanism which regulates both motor and secretory activity of the stomach. These nerves are influenced greatly by impulses arising in many regions of the body, and affect secretion and motility in a corresponding manner. The sight, taste, or smell of palatable food causes a reflex flow of gastric juice, whereas unpleasant food or painful stimuli produce marked inhibition.

Since our emotions are intimately associated with activity of the sympathetic nervous system, as has been interestingly demonstrated by the researches of Cannon, it is not difficult to understand how worry, anxiety, fear, or fright, exert a decided influence on gastric physiology. These emotions, associated with sympathetic stimulation, lead to a decrease in both secretion and motility of the stomach. The passage of food from the stomach is retarded, and, because of a lack of enzymes and hydrochloric

acid, it undergoes fermentation with the production of gaseous eructations. Probably a large percentage of our so-called dyspepsias are of this type. It may be said that psychological therapy in certain gastric disorders is not without some sound physiological basis.

But the secretory activity of the stomach is not entirely dependent upon its nerve supply. In 1906 Edkins carried out experiments which indicate that a chemical mechanism may account for the secretion of gastric juice. It was shown that many foods, such as broth or meat extracts, if placed in the stomach through a tube or fistula, would induce marked gastric secretion, even when all nerve supply to the stomach had been severed. Certain products of protein digestion, therefore, acted as specific excitants to gastric secretion. This substance was termed gastrin, or simply gastric hormone.

Further studies on the nature of this hormone have been made by Ivy and Farrell. They succeeded in transplanting a small denervated stomach into the mammary region of a dog, and by introducing certain foods into this stomach, they observed an increase in the flow of gastric juice. The increased secretion was not due to any mechanical irritation of the mucosa, but to a definite hormone carried to the stomach glands by the blood stream. It is well known that certain drugs, such as pilocarpine, muscarine or histamine will induce secretion of gastric juice, but the juice elaborated under the influence of these drugs is different from that resulting from the normal gastric hormone. Histamine produces a secretion containing a normal amount of hydrochloric acid, but deficient in enzymes. Additional studies on the nature of this secretory hormone have shown that it is formed in comparatively large quantities when acids come in contact with the duodenal mucosa. The hormone thus liberated is spoken of as secretin, and is probably identical with gastrin. Under normal conditions none of the hormone gets into the lumen of the duodenum, but is carried away by the blood stream, as in the case of any other internal secretion.

Purification of this hormone has been accomplished, but not in amounts to be of any great importance, as yet, to the gastro-enterologist. It promises, however, to supplant histamine in the detection of functional hypochlorhydria and achylia, being much superior to the latter drug in that it stimulates a more normal secretion and is devoid of the dilating effect upon the capillaries.

In summary, it might be said that gastric secretion may be divided into three phases: First, a cephalic phase, which includes psychic influences, such as the taste, sight, or smell of food. This is a purely nervous mechanism of gastric secretion. Second, a gastric phase resulting from the presence of certain foods in the stomach, effecting a liberation of gastrin; and, third, an intestinal phase in which secretin is formed by the ejection of acid-chyme on the duodenal mucosa. It has been shown by Pavlov that the quality of the gastric juice is remarkably adapted to the type of food to be digested. Fats and carbohydrates cause little secretion except through psychic influences, whereas proteins call forth a type of gastric juice particularly rich in enzymes.

"The stomach exhibits a postural activity or tone. When empty its walls are firmly in apposition. When food enters the stomach the muscle fibers are elongated to enlarge the size of the cavity uniformly, in order to accommodate the new contents without much change of internal pressure." (Wright). Within a short time after taking food movements begin. A constriction wave begins at the transverse band, or junction of cardia and pyloric antrum, and this wave of constriction progresses slowly and uniformly with a somewhat rotating movement toward the pylorus. At first these waves occur at intervals of about twenty seconds, and become more frequent and more powerful, arising farther and farther back in the cardia until practically the entire stomach is involved in these peristaltic movements. The cardiac orifice remains closed so that food is not forced back into the esophagus. As these waves progress toward the pyloric orifice they are preceded by a wave of relaxation which is made possible by the intrinsic innervation of the stomach musculature. This phenomenon, commonly called the myenteric reflex, or "law of the intestine," is not confined to the intestines alone, but is a common property of the entire alimentary canal. At certain intervals the pyloric sphincter relaxes and the constriction wave forces some of the stomach contents into the duodenum.

There has arisen much discussion and controversy regarding the mechanism of opening of the pyloric sphincter. Cannon has shown that hydrochloric acid in the stomach favors relaxation of the pylorus, while in the duodenum it causes contraction. "In

this way, it may be imagined that after each ejection of acid-chyme, the sphincter is kept closed until the acid material in the duodenum is neutralized, and so automatically a mechanism is provided by means of which the duodenum is charged at intervals, and at such times as it is prepared to receive and neutralize a new quantity of chyme." As beautiful and as well conceived as this theory might appear, it fails entirely to find support as clinical observation on the opening and closing of the pylorus. The presence of acid in the stomach probably plays no part in the opening of the pylorus. In achylia gastrica, there is no free hydrochloric acid, yet the stomach may empty itself with surprising rapidity, and the sphincter tend to be somewhat patulous. In duodenal ulcers associated with hyper-acidity, there may also be a rapid emptying time. In general, it is thought that the pylorus acts as we would expect any part of the intestinal tract; it opens as a wave of relaxation strikes it, and closes as it is involved in a peristaltic wave of constriction.

Under normal conditions reversed peristalsis is never found in the stomach. It does occur normally in the ascending colon, but its presence in other portions of the digestice tract usually portends some pathological condition, and may denote obstruction. In high obstruction, reversed peristalsis may involve the entire stomach, so that gastric contents or even intestinal contents may be forced back into the esophagus.

The phenomenon of vomiting does not necessarily imply reversed peristalsis, nor does it mean any activity on the part of the stomach. The muscles of respiration and the abdominal muscles are probably more concerned in the act of vomiting than the stomach musculature itself. The complex series of movements occurring during emesis are probably controlled by a group of nerve cells closely associated with the vagal nuclei in the medulla. This group of cells, located near the floor of the fourth ventricle, is termed the vomiting center, and is also in close connection with the salivary nuclei, which accounts for the salivation and nausea which usually precede vomiting. Since some of the vagal fibers terminate in the vomiting center, it is not difficult to understand how impulses arising in any organ innervated by the vagus nerve can easily induce reflex emesis. Emetic impulses frequently arise in the pharynx, esophagus, stomach, intestinal tract, heart, lungs or uterus, and many other regions.

When vomiting is excessive and prolonged, it gives rise to a group of symptoms resembling tetany. This condition is explained on the basis of certain changes in the blood as a result of the excessive loss of hydrogen ions. The continual loss of gastric juice, or hydrochloric acid particularly, creates a condition of alkalemia, which in turn affects the calcium of the blood. The reduction of so-called diffusible or ionized calcium leads to a state of increased nervous irritability and to the production of convulsions.

A study of the physiology of the stomach is incomplete without a brief consideration of certain gastric sensations. The sensations of appetite and of hunger are so closely associated that some observers held that there was only a quantitative difference. Experiments, however, have shown that the sensations are essentially different in many respects. Appetite is a pleasant sensation associated with a reflex secretion of saliva and gastric juice, and involves little or no motor activity on the part of the stomach. Hunger, on the other hand, is described as a dull, gnawing or aching sensation, and is referred to the epigastrium or lower sternum. The observations of Cannon, and of Carlson, and experiments in our own laboratory by Dr. Main, have shown that hunger pains are associated with intermittent contractions of the stomach. The peristaltic waves occurring during hunger differ from normal contraction in that they are not confined to pyloric region, but involve the entire organ.

The mucous membrane of the stomach is not sensitive to tactile stimuli as the mucosa is not endowed with nerve fibers carrying epicritic sensibility. Strong irritants may be introduced into the stomach without causing any pain, and may produce only a sensation of warmth, but violent contractions or forceful distention may give rise to severe pain. Considerable discomfort also results when a peristaltic wave passes over an ulcer. One of the most important causes of pain appears to be an increased tension of the stomach wall. A second cause of gastric pain is an involvement of the visceral peritoneum. Pains of gastric origin are usually referred to the epigastrium or lower sternum. As an explanation for the phenomena of referred pains, it has been suggested by Head, that, when two sensory nerves enter the spinal cord at the same level,

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one nerve carrying epicritic sensations from some cutaneous area, the other nerve carrying protopathic sensibility from some viscera, the cerebral cortex cannot definitely localize sensations from the viscera, but refers it to some corresponding region of the body where pain sensibility is more highly developed. Sherrington states that around the synapses in the spinal cord there is liberated an excitory substance which he terms "E" substance, and that this agent spreads or radiates through the cord, so that it may stimulate adjacent neurones, and will thus produce the same sensation as if these nerves had been stimulated at their particular end-organ in the skin.

It is quite obvious that this brief presentation of the physiology of the stomach is wholly inadequate for the gastro-enterologist. It may, however, serve as a nucleus around which a more detailed discussion of the intricate mechanism of gastric physiology can be woven. It will probably have its greatest value to those of us, who, having a more general interest in the medical sciences, are in need of a brief review on some of the more fundamental aspects of the physiology of the stomach, in preparation for a consideration of its disorders and their treatment.

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THE DIFFERENTIAL DIAGNOSIS OF DISEASES OF THE STOMACH.*

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In the diagnosis of diseases of the stomach the history is one of the most important factors. From a history, carefully taken and skilfully interpreted, we may learn, first, whether the patient's gastric symptoms are of primary or secondary importance; and, second, at the very outset we get a clue as to the patient's nervous and mental state. A thorough physical examination is also necessary, although, as a rule, little or no information is obtained from it concerning the stomach and its functions. The examination, however, enables us to determine whether disease elsewhere is likely to be the cause of the complaint correctly or incorrectly attributed by the patient to the stomach itself. It seems scarcely necessary to say that gastric symptoms are much more frequently due to disease in other organs, as, for example, in the gall-bladder, the appendix, the generative organs, the thyroid gland, the cardio-vascular, the pulmonary and the central nervous systems, than to disease in the stomach. The findings on the physical examination will lead us in making the special investigations necessary before arriving at a definite diagnosis.

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ORGANIC DISEASES OF THE STOMACH

Cancer. Cancer of the stomach should be our first thought when a person of middle age or older complains of any digestive disturbance. Gastric disturbances with loss of appetite, weight and strength beginning in the latter half of life will often be due to other causes, particularly cardio-vascular-renal disease and cholecystitis and less frequently indurated ulcers and gastric syphilis. If not concomitant, cardio-vascular-renal disease may be differentiated from cancer of the stomach by the history, by a study of the cardio-vascular system and renal function. The differentiation of cholecystitis and cancer of the stomach in its early stages may be difficult or impossible by the symptoms alone, although as a rule it is easily made by a roentgen-ray examination of the stomach and a cholecystogram. Difficulty may also be encountered

in differentiating the two conditions later, particularly when a mass is palpable just to the right of the mid-line, and if jaundice, which is not uncommon in the late stages of cancer of the stomach, is present. A palpable mass in the epigastrium may be due to inflammation and induration surrounding an ulcer, or to syphilis of the stomach. While much help will be obtained from the history and the examinations, including the roentgen-ray, the Wassermann and the therapeutic tests, in differentiating these conditions, yet the diagnosis may ultimately rest upon an abdominal exploration and a histologic examination of the tissue.

Ulcer. The most prominent symptom of ulcer of the stomach is pain in the epigastrium, which varies in intensity from a mild discomfort to a burning, boring pain, beginning in some instances a few minutes after meals, and in others from one to three hours later. The nearer the ulcer is situated to the pyloric sphincter the longer will the interval be between the meal and the onset of the pain, and the more will it simulate that of duodenal ulcer. Ulcers also cause nausea and vomiting, and less frequently hematemesis. Patients with gastric ulcer give a history of periods of remissions of symptoms, still the periodicity of the symptoms is often less striking than in cases of duodenal ulcer.

The really great diagnostic problem in all cases of ulcer, especially in patients past thirty years of age, is to differentiate ulcer and cancer. It may appear to be easy in some cases, still in other cases in which there is persistent swelling and induration or perhaps spreading of the lesion, we cannot be certain that cancerous changes have not taken place except by exploration and examination of sections of the tissue.

Ulcers are often attended with complications, the most important of which are pyloric obstruction and perforation. Obstruction to the passage of food through the pylorus may be suspected when the patient complains either of increased pain in the epigastrium, or increased nausea and vomiting, or the vomiting of large quantities of food. While the differentiation of pyloric obstruction due to spasm of the pylorus from that due to an unyielding cicatrix cannot be readily made in all cases, even with the roentgen-ray, yet the patient's response to rest in bed, belladonna, sedatives, and a reduction in the diet is an aid in determining the nature of the obstruction.

Perforation is the most serious complication. It may occur at any time in the course of an ulcer. Instantly the patient suffers severe pain in the epigastrium. The board-like rigidity of the abdominal muscles and the constitutional symptoms developing almost immediately after the perforation indicate an acute surgical condition. The finding of air beneath the diaphragm on the flat roentgen-ray film, is pathognomonic of a perforation in the stomach or upper portion of the small intestine.

Gastritis. It is doubtful now whether gastritis exists as an entity. It is commonly associated with gastric ulcer and cancer, and it may also be associated with some of the constitutional diseases, but in all these cases it is overshadowed by the more important primary condition. The diagnosis of gastritis, or perhaps more properly, gastro-enteritis, may be made in those cases in which the ingestion of spoiled food or an excess of alcohol or corrosive drugs causes pain, nausea, vomiting and often diarrhea. In some cases the question may arise whether the patient has acute appendicitis. In the latter condition the pain localizes in the right lower quadrant; there is increased tenderness in this region on the sudden release of pressure, and also radiation of pain on pressure to the epigastrium. The white and differential leucocyte counts may also be helpful. Frequently the attack is confused with gall-stone colic. In the passage of a gall-stone the pain and tenderness become more intense in the region of the gall-bladder, and vomiting occurs as the pain reaches its height. The gastric crises of tabes dorsalis may also be confounded with acute gastro-enteritis in adults, and it is always wise to test the patella and pupillary reflexes.

Syphilis. Although not of common occurrence, syphilis of the stomach is being recognized more frequently. The lesion is generally a tertiary one, causing ulceration, fibrosis, and contraction without pathognomonic symptoms. While the symptoms may simulate those of ulcer or cancer, and the finding of a palpable mass in the epigastrium will even more strongly suggest a cancer, yet a history of the patient's having contracted syphilis several years previously, or the finding of a positive Wassermann reaction of the blood or spinal fluid and other syphilitic stigmata, are in favor of the diagnosis of syphilis. Syphilitic lesions of the stomach are said to present a characteristic roentgenological appearance, still in some instances it is difficult for the

roentgenologist to distinguish them from cancer. When such difficulty is encountered, the therapeutic test may be helpful in clarifying the diagnosis; time should not be lost, however, in giving the test since patients with syphilis are not immune to cancer.

Foreign Bodies. Small foreign bodies in the stomach generally do not cause symptoms, while larger bodies may cause either acute or chronic symptoms. In the majority of cases we can obtain a history of the patient having swallowed an object, or eaten some fruit such as the persimmon, which contains a high percentage of gum and pectin. When such a history cannot be obtained, we must rely upon the roentgen-ray for the diagnosis.

FUNCTIONAL GASTRIC DISTURBANCES

A great many gastric disturbances must be called functional for the reason that no organic disease can be found to explain them. The symptoms which may be engendered by the state of mind, or by fatigue may affect any part of the gastrointestinal tract, although the stomach is the most frequently affected. Bad news, controversies, anxiety, worry, domestic unhappiness, thwarted ambitions, unhappy and uncongenial surroundings, prolonged mental and physical strain frequently cause uncomfortable sensations in the epigastrium, nausea, vomiting, and loss of appetite.

Fatigue neurosis is perhaps the most common diagnosis which is made in cases of nervous patients who show no sign of organic disease. These patients complain of loss of appetite, fulness after meals, belching, constipation and nervousness following long hours of work, heavy responsibility, and perhaps insomnia. They often observe that their symptoms improve or disappear when they take a rest. In some instances there is no history of long hours of work, still the patients are irritable, tense, apprehensive or on edge. Many other men and women get along well enough until their emotions are aroused, or they are annoyed and lose their temper. Discomfort in the epigastrium and sometimes severe pain follows an emotional debauch. There are other people, who through daily fear of some malady, particularly cancer, have digestive disturbances of various kinds constantly, or at intervals for years.

The neuroses, particularly neurasthenia and psychopathy, are the cause of gastrointestinal symptoms in many people. These people have a poor nervous heredity and are unable to adjust themselves to their environment. They spend their energy unnecessarily and unwisely in worrying about everything around them, and about diseases they do not have; they cannot make decisions quickly; painful emotions are racking them day after day and night after night.

A number of women with hypo-ovarianism are unhappy and poorly adjusted; some are restless because they have not married, and others who are married are worried because their sex life is puzzling and unsatisfactory to them. They, like the neurasthenics and the psychopaths, are prone to be querulous; they complain at different times of pain in the epigastrium and in other parts of the abdomen, of loss of appetite, nausea, abdominal distention, of queer sensations in the head, and so on until in the course of a few years they seem to have had symptoms of nearly every disease that is known. They do not confess their real trouble unless we tactfully open the way for them to talk. In all of these cases we must focus our attention on the inherent or acquired weakness of the patient, and his or her inability to become adjusted rather than on the aches and pains in the abdomen.

Gastric symptoms are frequently complained of by men and women who have long slender bodies. While such a body habitus cannot be considered a disease, yet it predisposes its holder to the development of symptoms should other factors become operative. Such factors as infections, wasting illnesses, worries, continual loss of sleep, mental overwork, and dissipation cause a loss of weight in one who is already undernourished, and a disappearance of the deposits of fat around the abdominal organs, weakening the natural support of these organs. This, combined with weakness of the muscles of the abdomen and back, increases the negative pressure within the abdominal cavity and allows the stomach and intestines to become displaced downward with splanchnic venous stasis. Later a long train of purely functional symptoms begins. In addition to the ptosis we sometimes find a diminished or absence of the secretion of hydrochloric acid, rapid emptying of the stomach, a low blood pressure, a low metabolic rate and a secondary anemia. Many of these individuals are not neurotic; there is a real physical basis for their symptoms which improve, sometimes dramatically, under appropriate treatment. There are, however, in the

visceroptotic group a number of people of poor heredity which predisposes them to a weakened constitution and nervous tendencies. They are hypersensitive, they exaggerate their symptoms, and the mention of a fallen stomach or intestine or kidney increases their misery.

The physician will suspect that gastric disturbances are neurotic in origin or functional in nature by the variability of the symptoms, inconstant repetitions, the effect of psychic influences, and negative physical, roentgen-ray and laboratory examinations.

DISTURBANCES OF GASTRIC SECRETION

Disturbances of gastric secretion have occasioned much interest and speculation. It is well known that there are normal variations in the secretion of hydrochloric acid, and that hyperacidity, hypoacidity or even achlorhydria may be present without causing symptoms. When hyperacidity is found it may have no significance, it may be due to hypersensitiveness of the patient, or it may be a result of organic disease. Even when associated with pyrosis it is probable that the symptoms are due to disordered peristalsis rather than to the hyperacidity. A trustworthy diagnosis of hyperacidity cannot be made from the symptoms alone.

The incidence of hypochlorhydria or achlorhydria is greater than that of hyperacidity. This may be accounted for by the frequency with which we find achlorhydria in elderly people, still we often find a subnormal or an absence of the secretion of hydrochloric acid in young and middle aged people. Although achlorhydria is found in healthy people, yet it is much more likely to cause symptoms than is hyperacidity. It often causes a loss of appetite, nausea, a burning sensation before meals, fullness after meals and eructations. The only symptom, however, which can be ascribed with confidence to it is diarrhea. While diarrhea does not occur in a high percentage of cases, yet it is an important symptom for the reason that other types of diarrhea are rarer in this climate.

When achlorhydria is present in persons not advanced in years, or in those who have no demonstrable disease, the question often arises whether it is due to atrophic gastritis or whether it is of functional origin. Several investigators, after postmortem studies of the gastric mucous membrane of men and women who had achlorhydria for years, concluded that, although some inflammatory changes can be found, atrophic changes are generally insignificant or absent.

The relationship between achlorhydria and nervousness, and such psychic states as anger, worry and anxiety, is an interesting one. Experience has shown that a certain variation in gastric analyses may be attributed to psychic or nervous influences, and that these variations tend to be more marked in neurotic individuals, still it is highly improbable that complete absence of hydrochloric acid can be attributed to transient nervous or emotional disturbances. General nervousness may cause a patient with achlorhydria to notice gastric or intestinal symptoms which might otherwise be disregarded. On the other hand, the nervous condition may be in some way a result, not the cause of the digestive disturbances, since in many instances the effects of the achlorhydria are corrected by a proper diet and the administration of hydrochloric acid.

In spite of every refinement of the technic, gastric analysis still fails in most cases to throw much light on the diagnosis of disease except in pernicious anemia. Its greatest usefulness is in demonstrating the presence or absence of hydrochloric acid, lactic acid, Sarcinae and Boas-Oppler bacilli.

THE VALUE OF THE ROENTGEN-RAY

The roentgen-ray has become a necessity in making a diagnosis of gastric disturbances. Every patient with a gastric complaint that cannot be readily diagnosed, or whose symptoms persist after a reasonable period of treatment, should have the benefit of a roentgen-ray examination. By it we visualize the size, shape and position of the stomach; the occurrence, rate and character of the peristaltic waves, the emptying time, and filling defects and their location. Of special value are repeated examinations in cases of ulcer to determine the stage of healing, or spreading of the lesion, and the necessity for excision if there is no response to treatment. While the clinical study of the patient is always of the greatest importance, still the roentgen-ray is indispensable in patients with gastric complaints since it enables us to make a more accurate diagnosis.

XUM

THE MEDICAL TREATMENT OF DISEASES OF THE STOMACH.*

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The large majority of patients with gastric complaints will be found to be suffering from functional disorders rather than organic disease and therefore we shall discuss these conditions first.

Brown[1] classes the functional disorders as primary, psychogenic, and reflex.

The treatment of the primary disorders consists of the correction of the causative bad habits. These are rapid eating, improper mastication, irregular meal hours, poor choice of foods, eating when fatigued or emotionally upset, and lack of exercise, fresh air, sleep, and diversion.

The treatment of the psychogenic group, or those whom we may classify as having gastric neuroses, is probably the most trying and yet the most important problem which we have in the field of gastric complaints. The most essential procedure in the treatment of these cases is a searching history and a painstaking physical examination, including all necessary laboratory tests. All too often these patients have been turned away, after a cursory examination, with a prescription for an alkaline powder, which may be contra-indicated, and the advice to quit worrying over a complaint which is purely nervous. We should always remember that neurotic patients are subject to organic disease and that many functional disorders will respond to proper treatment. Our approach to the problems with sympathy, patience, and thoroughness in every detail will have a most helpful effect. If, at the conclusion of our study, we can tell the patient that he has no organic disease but does have a functional disorder, he will have more respect for our judgment and will be more willing to cooperate in the treatment. The most helpful book I have read on this subject is "Nervous Indigestion" by Alvarez,[2] of the Mayo Clinic. This book should be read and reread by every practitioner of medicine.

Without attempting to go into the treatment of the protean symptoms of the gastric neuroses, whether they be sensory, motor, or secretory, there are certain general principles which should be followed.

Ofttimes the convincing exclusion of organic disease will effect a cure. Again, the measures recommended for primary functional disorders will be effective.

As shown by Alvarez, the emotions often play a leading role in gastric complaints, and if the symptoms are due to an unhappy marriage or to business reverses, it is futile to expect results from a diet or a bitter tonic. If we can get the emotional conflict out into the open, and explain the relationship to the patient, much may be accomplished even if the environmental situation cannot be remedied.

Rest is a most important factor in the treatment of these cases. With some patients a rest cure in a hospital or nursing home will work wonders. When this is impracticable, modified rest may be taken at home. For the business man afternoons off and week-ends in bed, and for the woman a regular rest period of two hours in the afternoon with more outside diversion, proves helpful.

Many of these patients sleep poorly and can be greatly helped by the use of sedatives, which must be kept up over a fairly long period of time to be effective. Alvarez recommends the use of one to three tablets of carbromal or bromural which do not cause depressing after-effects or skin rashes. We have obtained very nice results in a few cases with a scopolamine, gr. 1/100, at bedtime.

The most useful diet in my hands has been the smooth diet recommended by Alvarez, which supplies a wide choice of foods and yet avoids the rough indigestible articles that so often cause flatulence and other trouble.

The abuse of cathartics is a large factor in many of these cases, interfering with the assimilation of food and increasing peristalsis in a digestive tract which is already irritable. Constipation should be treated by the establishment of a regular habit-time, exercise (particular attention being given to the abdominal muscles) and diet. Cathartics, bran, and roughage diets should be avoided. An enema of normal salt solution, one tablespoonful of salt to one-half gallon of water, may be used daily and

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almost indefinitely without irritation, or a retention enema of one to two ounces of olive oil may be given at bedtime.

As a general principle defective teeth and refractive errors should be corrected. Definite foci of infection should be removed and the general physical condition of the patient should be improved in every way. Frequent contact with these patients is essential as they need constant encouragement and supervision, and at each visit a definite return engagement should be made.

Aside from sedatives, drugs are relatively unimportant, our chief confidence being placed in psychotherapy. Cases associated with anemia are benefited by inorganic iron, a convenient form being a 50 per cent aqueous solution of iron and ammonium citrate in doses of one-half to one dram, or Blaud's pills, ten to twenty grains, after meals.

Some cases of flatulence are helped by belladonna, and we still feel that bitter tonics, such as compound tincture of cardamon, have their place in the treatment of anorexia.

The functional disorders of reflex origin are numerous and the treatment rests with that of the causative agent, as the gall-bladder, pelvic organs, appendix, etc. Obviously, the correct diagnosis is essential if we would avoid the embarrassment of treating one of these cases as a neurosis or as ulcer when the cause is of reflex origin.

The treatment of organic diseases of the stomach is well discussed in any textbook and will be dealt with very briefly.

Acute Gastritis.—In the toxic cases, due to various poisons, in addition to prompt emptying of the stomach and the use of the proper antidote, we should remember that certain substances, such as mercury and arsenic, are resecreted from the stomach after being absorbed and therefore repeated lavage is necessary. The intravenous injection of sodium thiosulphate, 0.5 gm. in 10 c.c. of normal saline, given daily for four or five doses, has been favorably reported by some observers, and is worthy of trial in cases of arsenic or mercury poisoning.

Gastroptosis is part of the picture of visceroptosis and in a great many persons causes no symptoms. In some cases it should receive the treatment appropriate for the neuroses. As an organic disease the name should be reserved for those rare cases showing marked delay in the emptying of the stomach and actual pyloric stenosis. Alvarez is not convinced that visceroptosis is a disease, and probably much harm has been done by the medical profession by planting the idea of a "fallen stomach" in the mind of a neurotic patient.

Peptic Ulcer.—Time does not permit more than a generalization in the treatment of this common and important disease. The Sippy diet, or one of its various modifications, is still most generally used for the first one or two weeks with gradual additions of soft non-irritating foods until, after two or three months, Alvarez's smooth diet may be used. In my experience patients have done much better if kept in bed for the first few weeks, and it is most important that they remain permanently on a non-irritating diet. The use of tobacco should usually be restricted and in some cases forbidden. Regular meal hours, avoidance of physical and mental fatigue, thorough mastication of food, and a rest period after meals are essential in the after-treatment of these cases. These measures are equally important in those cases which have had surgical treatment and cannot be too strongly emphasized, as most patients become careless once they are free from pain. Recurrences may sometimes be avoided by these precautions.

The use of antacids will be taken up under the discussion of hyperchlorhydria. Many cases are made more comfortable by taking a teaspoonful of bismuth before breakfast. If pain persists in spite of the diet and alkalies, the use of an ice-bag is helpful. Belladonna or atropine will also give relief in some cases.

Syphilis of the stomach should receive the treatment appropriate to that of tertiary syphilis, but, according to Harris and Youmans,[3] bismuth or mercury and iodides should precede arsphenamines for several weeks. Perforation has been reported in cases treated vigorously with arsphenamines, without a preliminary course of bismuth or mercury.

Gastric Hemorrhage.—Rest is the first essential, and much may be accomplished in allaying the patient's ungrounded fear of death. Morphine is usually necessary and may be repeated. To increase the coagulability of the blood, Andresen[4] uses 30 to 50 c.c. of a 10 per cent solution of sodium citrate intravenously, or 10 to 20 c.c. of whole blood intramuscularly. He advises cautious increase of the blood volume. Small transfusions of blood—150 to 200 c.c.—are given if imperative,

before the end of the first week. After this, 500 c.c. may be given, as the clot will have become firmly attached. To combat hyperchlorhydria with digestion of the clot, and increased peristalsis, he gives the following solution: gelatin one ounce, lactose three ounces, the juice of one orange, and one quart of water. This is used in amounts of from four to six ounces every one and one-half to two hours. After two or three days, cereal gruel, milk, lactose, and cream mixtures are substituted for every other gelatin feeding. At the end of a week an ulcer diet may be given. As contraindications, he gives the use of ice either by mouth or externally, fasting, rectal feedings, and intravenous administration of fluids.

Another contraindication, not mentioned by this author, is the use of the X-ray for diagnosis soon after hemorrhage. This cannot be too strongly condemned, as it has been followed by perforation and death. A good rule is not to X-ray these patients for at least four to six weeks after hemorrhage, and not until the guaiac test for blood in the stools is negative.

Hyperchlorhydria.—Einhorn[5] recommends a non-irritating diet free from spices, much table salt, concentrated meat juices and soup, strong coffee, and liquors. He allows plenty of milk, butter, eggs, vegetable soups, white bread, and tender meat (once daily) and advises frequent meals, avoidance of worry and business strain. He restricts the use of tobacco and advises fresh air and gymnastics. Loevenhart and Crandall[6] recommend the use of calcium carbonate as the ideal antacid because it is neutral in reaction and does not cause alkalosis; it can be given in almost any amount, as an excess passes out in the feces without any effect on the bowel except to coat over ulcerated areas. It may be conveniently given in compressed tablets of ten grains of calcium carbonate with 1/40 minim of oil of cinnamon, manufactured by Hynson, Wescott & Dunning. One tablet will ordinarily neutralize more than the amount of acid found in the basal or continuous secretion of the stomach.

Achlorhydria.—Simple achlorhydric anemia responds promptly to the use of inorganic iron, according to Haden,[7] Rosenthal and Abel,[8] and others, and antacids are not necessary. These cases should be kept on iron permanently, however, as they will relapse just as pernicious anemia cases do when liver is not given.

Einhorn recommends a diet of cereals, vegetables, milk, stewed fruit, a few eggs, and small quantity of white meat. He advises the avoidance of coarse foods and the giving of frequent small meals.

Symptomatically the use of dilute hydrochloric acid works beautifully in those cases associated with diarrhea, but Dobson[9] recommends its use in all cases of achlorhydria for the following reasons: 1. To act as a stomachic; 2. To form acid albuminates and so aid in proteolysis; 3. To release pepsin from the pepsinogen of the glands; 4. To promote an acid medium for the action of pepsin; 5. To act as an antiseptic; 6. To stimulate pancreatic secretion; 7. To improve tonus and peristalsis; 8. To aid in the solution of insoluble calcium and magnesium salts in the ingesta; and, 9. To stimulate the secretion of hydrochloric acid.

Most of us have given acid in ridiculously small doses, whereas numerous observers have shown that large doses are necessary. Dobson suggests the use of thirty minim doses in two ounces of water, grape juice, or other liquid, to be given at the middle of the meal, and repeated at fifteen-minute intervals for an hour or more afterwards. He also uses pepsin in the form of gastron in one to two dram doses.

For the occasional case which cannot or will not take the acid, we may try the use of two ounces of lemon juice or six ounces of grape fruit juice, well diluted with water and sweetened to taste with sugar, with each meal. Sansum and Gray[10] have reported satisfactory results with this method.

In the presentation of this large subject we have been forced to deal superficially with a number of conditions. Several important diseases, such as cancer, acute dilatation of the stomach, and pyloric stenosis, have been left for surgical consideration. No originality is claimed and material found in various medical publications has been used freely. We have attempted to emphasize the frequency and importance of the functional disorders, and to review briefly some of the more important measures in the treatment of the organic conditions.

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SURGICAL TREATMENT OF DISEASES OF THE STOMACH.*

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The impossibility of encompassing in a period of fifteen minutes anything like a complete discussion of surgery of the stomach is obvious. I shall, therefore, limit myself to some very general principles, dealing especially with the indications for surgical treatment of diseases of the stomach, the pathologic processes which lend themselves to correction by surgical procedures and the physiologic functions which may be restored surgically. For convenience, the diseases and other abnormalities of the stomach will be discussed under several groups arranged according to etiologic factors.

First, however, it must be emphasized that a proper understanding of certain anatomic and physiologic facts concerning the function of the stomach are essential, not only in deciding upon the advisability of employing surgical treatment, but further in selecting the type of procedure to be employed, in preparing the patient for operation and in supporting the patient through the immediate and remote post-operative convalescence. The stomach is more than a temporary food receptacle. Its muscular contractions mix the food with acid and pepsin from the fundus to initiate its digestion. They also propel the food through the stomach while alkaline mucus from the prepyloric portion of the stomach commences the reduction of the relatively high gastric acidity. Finally, the strongly alkaline pancreatic juice, bile and duodenal secretion, partly by regurgitation into the stomach and partly by action in the first portion of the duodenum, complete the essential neutralization.

Injuries. Certain conditions offer obvious and usually immediate indications for surgical treatment. Penetrating wounds of the abdominal wall and certain injuries by blunt force with definite or reasonably presumptive evidence of perforation or other serious harm to the stomach or other viscera necessitate prompt exploratory operation. The phrase "reasonably presumptive evidence" is important. Not infrequently valuable time is lost and prognosis is influenced adversely by temporizing too long in doubtful cases. The operation of choice is the simplest repair possible under the circumstances.

Foreign Bodies. Foreign bodies in the stomach may or may not necessitate surgical intervention. Usually, however, the larger and more irregular or sharper particles do. Certain of them may yield to endoscopic removal; others may require gastrotomy. It is worthwhile to note in passing that straight pins and needles may be delivered by pricking them through the gastric wall and that open safety pins may be closed within the stomach by manipulation and allowed to pass through the alimentary canal, thereby obviating the risk attendant upon opening the stomach.

Syphilis and Tuberculosis. Rarely, two common systemic diseases, tuberculosis and syphilis, may cause lesions of the stomach. It is the ulcerative and cicatricial sequelae of the gastric involvement

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with consequent pyloric stenosis which occasionally require surgical treatment, either directly, the removal of the lesion, or indirectly, the restoration of function by pyloroplasty or gastro-enterostomy.

Congenital Anomalies. Congenital anomalies of the stomach may be found. Diverticulae and partitions are among the intrinsic anomalies and abnormalities in position the extrinsic anomalies, all of which are rare. Congenital hypertrophic stenosis of the pylorus, however, is not uncommon, and here again a word of caution in regard to too long temporization may not be amiss. The Rammstedt operation, dividing the pyloric tumor without entering the lumen of the gut, is eminently satisfactory and, in competent hands, is attended by an almost negligible risk.

Dysfunctions. Functional abnormalities of the gastric mechanism may be sometimes so stubborn that surgical intervention is desirable. It is presupposed of course that the more frequent extrinsic causes—chronic cholecystitis, chronic appendicitis, and other intra-abdominal and systemic diseases—have been precluded as of etiologic significance by appropriate diagnostic and therapeutic measures. Cardiospasm, pylorospasm, and chronic dilatation of the stomach, may necessitate plastic operations on the inlet or the outlet of the stomach, or, as in the case of the latter, some such procedure as gastro-enterostomy in order to provide adequate function of the stomach. When one finds stubborn pylorospasm it is important to recall that hypertrophy of the pylorus with consequent stenosis may occur in adults as well as in infants. I have previously reported three instances of this condition.

Ptosis. Ptosis of the stomach occurs usually in conjunction with general visceroptosis. Operation may be considered but only with the utmost caution and not until all other corrective measures have failed. Reasonable benefit from operation may be expected only in those patients with marked delay in the emptying time of the stomach, usually the result of adhesions or other extragastric factors responsible for a relatively fixed ptosis.

Benign Tumors. Benign tumors of the stomach are not nearly so uncommon as at one time believed. Adenomas and papillomas are the most common, though fibromas, lipomas and other types of benign tumor have been described. Occasionally polyposis occurs. Because of not infrequent chronic or acute hemorrhage, the danger or actual occurrence of malignant degeneration and in rare instances some degree of occlusion of the pylorus by the tumor surgical treatment should be advised for many patients. Local excision of solitary tumors will often suffice, though gastrectomy may be necessary in some instances. In this connection may be mentioned redundancy of the prepyloric gastric mucosa, which may prolapse through the pyloric ring and cause distressing symptoms. In one patient, I made a pyloroplasty in order to correct a condition which on viewing the pylorus from the duodenal side looked like nothing else so much as the anal orifice of a patient with prolapsing hemorrhoids.

Malignant Tumors. Because of their importance and controversial nature, I have on purpose reserved the discussion of gastric carcinoma and peptic ulcer of the stomach until the end. Malignant tumors of the stomach are almost always carcinomatous though in rare instances lymphosarcoma and even sarcoma arising in the muscle may be seen. It is important to remember that lymphosarcoma is radio-sensitive. I have a patient explored three years ago for a very extensive and hopelessly inoperable lymphosarcoma of the stomach who is alive and apparently well today, thanks to radiotherapy. Carcinoma of the stomach is radio-resistant. Radical resection of the tumor is the treatment of choice in all malignant tumors of the stomach.

Carcinoma. A major problem in carcinoma of the stomach is diagnosis, with the importance of very early diagnosis the chief concern. Even at the risk of undue repetition I would emphasize the urgency of, first, the education of the public to seek medical advice promptly for gastric symptoms; second, the education of the physician to recommend competent roentgenologic examination of the stomach in patients with persistent dyspepsia, and, third, the further education of the physician to look upon every proliferative and ulcerative lesion of the stomach as potentially malignant until proved otherwise.

Malignant degeneration of polyps and other benign tumors of the stomach has been demonstrated repeatedly. The frequency of malignant degeneration of gastric ulcer is a controversial subject but, regardless of our opinions in the matter, it is an admitted fact that it is impossible roentgenologically or by any other non-surgical method to demonstrate with certainty whether a given gastric ulceration is

benign or malignant. Although we know that most ulcerations on the greater curvature are malignant while most of those on the lesser curvature, except in the prepyloric region, are benign, we can have no assurance of that fact. Ulceration no larger than a dime but with metastasis to the lmph nodes has been reported from the Mayo Clinic.

Radical surgical measures employed early offer the only hope of cure, but, unfortunately, the majority of patients with gastric malignancy do not come to the surgeon until the disease has progressed so far that extensive spread and sometimes distant metastases have occurred. In many instances a curative operation cannot be even attempted. The choice of a palliative operation, however, is important. Partial gastrectomy where possible, even though accompanied by a slightly higher risk than gastro-enterostomy, is perferable because of the greater comfort afforded the patient. In this connection also, Horsley has pointed out that many patients, in whom the chance of a cure by radical operation seems slight because of the extensiveness of the growth, obtain surprisingly good results by very radical resections, even including in the dissection parts of adjacent organs.

The operation itself may be varied. The Polya or Billroth methods or one of their various modifications are most commonly used. Because it can be accomplished in two separate stages, the Billroth II operation is very useful, especially in patients that are poor surgical risks. The importance of the most radical operation possible performed at the earliest feasible moment cannot be too strongly emphasized. Meticulous pre-operative, operative and post-operative management are presupposed.

Gastric Ulcer. Peptic ulcer and its management is always a source of worry to internist and surgeon alike. Because of the similarities and dissimilarities between gastric and duodenal ulceration it is almost impossible to discuss one without mentioning the other. Both probably have the same etiologic factors but their pathologic differences depend upon anatomical and physiological differences in their respective locations. There is a good deal of evidence, experimental and clinical, to suggest that mechanical factors determine the location of the ulceration, and that mechanical and chemical factors combined determine the persistent chronicity chararcteristic of the lesion. The mechanical factor is the result of the convergence of the lines of force of the contracting and emptying stomach to certain parts of the stomach and duodenum. The chemical factor seems to be, at least partly, uncontrolled acidity of the gastric chyme. The possible neurogenic origin of the motor and secretory dyscrasias presents an interesting field for speculation and investigation. The surgery of peptic ulcer must be based on a knowledge of these physiological facts.

Both gastric and duodenal ulcerations are subject to certain complications—hemorrhage, perforation and obstruction to the outlet of the stomach at the pylorus. Hemorrhage, either recurrent or massive, is usually a definite indication for surgical treatment. It is important to remember that an operation performed primarily because of hemorrhage is usually not adequate unless the ulceration is excised. It has been found that bleeding often recurs if gastro-enterostomy is done without excising the ulcer itself. If excision of the ulceration is for any reason impracticable, ligation of the large vessels supplying the area of ulceration is the next best procedure and should not be omitted when performing indirect operations.

The perforation of an ulcer, unless of more than twenty-four hours duration is an indication for immediate exploration of the abdomen. The sooner the operation is performed the better will be the patient's chance of recovery. The risk increases with each hour of delay. Usually after twenty-four hours or more, the patient is either in too poor condition to stand operation or else there is a walling-off reaction on the part of the peritoneum so that it is safer not to interfere until a definite abscess has formed and simple drainage can be instituted. The surgical management of the perforation will vary with the character and site of the perforation and the condition of the patient. Burning away the ulcer crater about the perforation with the electric cautery and simple closure of the defect is sometimes sufficient. In some instances it is necessary to make in addition a gastro-enterostomy or a pyloroplasty to provide adequate drainage of the stomach. It is a mistake, however, to do more than the exigencies of the situation actually necessitate.

Obstruction to the outlet of the stomach may be due to spasm, acute inflammatory tissue around the ulcer, or to fibrosis caused by a long standing inflammation. The first two varieties frequently re-

XUM

spond to medical measures; the last mentioned, however, necessitates surgical intervention. Gastroenterostomy is the ideal operation in this condition, provided, of course, that one is sure that the ulcer, if on the gastric side of the pylorus, is not malignant, in which case a partial gastrectomy is necessary.

The economic and social status of the patients with peptic ulcer, their mode of living and their dietary habits and limitations are important. It may be practically impossible for some to adhere to an adequate medical regimen. For those who are economically unable or not sufficiently intelligent or willing to cooperate, the prescribing of medical treatment is too frequently a waste of time and delays eventual rehabilitation.

The proper management of peptic ulcer is seldom a strictly medical or a strictly surgical problem. It is rather a joint responsibility of the internist and the surgeon, working hand in hand with each other and with the roentgenologist who can give them such important information concerning the behavior of the ulcer.

The disputed relationship between benign gastric ulcer and carcinoma of the stomach I have already mentioned. I would emphasize again, however, that whether we believe that gastric ulcer may undergo malignant degeneration or not does not alter the fact that even the most capabale roentgenologist cannot tell with certainty whether a given gastric ulceration is benign or malignant. Therefore, an ulceration in the stomach might better be considered an indication for surgical treatment until proved otherwise. In young persons with small uncomplicated gastric ulcerations and roentgenologic evidence of response to medical treatment within two or three weeks, surgical intervention would seldom be warranted. As the age of the patient increases, however, the danger of even small gastric ulcerations being malignant increases, and greater caution must be exercised. In the middle-aged or older patient, even the small gastric ulceration, unless it shows roentgenologically prompt diminution in size under treatment, and assuredly the larger ulcerations are potentially malignant and should be excised.

In conclusion, I would emphasize that gastric surgery is a responsibility not to be assumed lightly by any surgeon without an intimate knowledge of its underlying principles. The excellence of operative technic will not compensate for an ill-advised operation or one chosen contrary to the various applications of these underlying principles to the individual case at hand.

DISCUSSION OF PAPERS BY DRS. BOND, SEWARD, ROBERTSON AND MORTON, IN THE SYMPOSIUM ON "DISEASES OF THE STOMACH."

DR. G. F. SIMPSON, Purcellville: To attempt in the short space of five minutes to discuss the splendid papers presented here today would be the height of folly, especially so for a man who is doing and has been doing through all his medical life, country work, away from the centers of education. The essayists have given you papers covering all the phases of this important subject, a concise review of the literature and the scientific work done by all the physicians, I might say, almost, in the land, to solve this important problem.

In the classifications, as outlined by most of the men, they gave two general classifications: first, the primary psychic or neurotic disturbances of the function of the stomach, and, secondly, the organic lesions. These they have divided into various subdivisions. I want to give you just one instance, to show that you may have a psychic or functional condition and an organic lesion in one and the same patient.

A wealthy New Yorker came to the adjoining county of Loudoun and bought a home and established a residence there. Some few years before that he had been attended in one of the larger clinics in New York City for a peptic ulcer. He had been examined thoroughly and carefully by the scientists and successfully treated, and discharged with specific instructions as to what he should do and what he should not do, in order to prolong his life. Special instructions had been given him that a return of the ulcer was a probability in the future, and also that in later life he might develop a carcinoma in the old ulcer scar. Business connections and the necessity of properly educating his only daughter caused him to make periodical trips to London, Paris, Berlin, and Rome. On these trips, due to the importance that the specialists had attached to his condition, he had certain gastric nervous symptoms, and frequently consulted a physician or an internist—once in Paris, once in London, once in Berlin, and once in Italy. They put him through the clinics, in order to determine whether he was developing one of the complications that might follow such a condition. By this time he had become an introvert and a neurotic. He went down with a mild attack of flu, and his wife and family in-

sisted that he go to a clinic in Boston for an examination, in order to find out what was the cause of his nervous condition. Again, the examination was negative. The only fact developed in that clinic was that there was some disturbance of the pituitary gland that might account for his neurotic symptoms. He came home. I was called one night to see a butler who needed some surgical attention. I had treated his family for five or six years. When I came down from seeing this patient, his wife insisted that I come in for a social visit, which I did. He then referred to his physical condition and insisted on telling me the whole story, and did so, finishing with the story of this neurological examination in Boston. He wanted to know what I thought of his condition. I told him there was not a thing the matter with him. He promptly threw up his hands and said: "Why didn't the specialists in London and Paris and Berlin tell me that, Doctor?" I said: "Because they have reputations to maintain, and I, being a country doctor, have not." I made these statements dramatically, in order to impress it upon him. By the way, he was about thirty-eight years old and as fine a physical specimen as I have ever seen. He said: "Do you mean to tell me that I can discard this alkaline treatment and all these other instructions?" I said: "Why not?" He then pulled open a drawer, and I am not exaggerating when I tell you he pulled out two boxes the size of a shoe box, full of capsules, that he had been carrying all over the world with him. He said: "I will give this to you."

Well, time went on; he had nervous attacks sometimes and would come to see me. After about five years I saw him one day, and he asked me to go in the drug store with him. He told me about his travels; he had been to Morocco, Algiers, and other places, and he had taken up flying. I said: "What of your gastric ulcer?" "Oh," he said, "I had forgotten all about that."

The point is, specialists are making neurotics of these patients. You will recall that Dr. Alvarez reported a series of complete gastric analyses of some 3,476 normal people. (I say "normal," but who is normal?) They found that the hydrochloric acid, in certain classes of cases, will vary from nothing up to about sixty in the stomach. They examined two women over the period of a month, making daily examinations, and found a mean variation of between 36 and 40, I think. (I am not giving you exact figures). One of them ran around that for the whole period. The other, about the middle of the month, became highly nervous under some emotional stress, and her's varied from 30 to 60. In the highly neurotic cases, many would have as much as 2,000 units of pepsin in the stomach and were perfectly normal. There is a thought there, that we are dealing with a biological condition. The essayists and other writers have called attention to the biological side. We have done an enormous amount of work, intensive collective work, on individual diseased conditions; but, after all, before we correct these, may it not be necessary for us to consider the individual as a biological being when we are treating these conditions? We have laid a great deal of stress upon examinations by the internist, the surgeon, the roentgenologist, and others, but there has not been anything said at all about the history that we do not have of the men who are doing general work, who, due to their environment and the conditions under which they labor, can not furnish those more highly favored with the material that they have. What would be the picture of our conditions if we had their report?

DR. WRIGHT CLARKSON, Petersburg: I wish to express my appreciation for the invitation to discuss the radiological aspects of this symposium, and also to compliment the essayists on the quality of their respective papers. I particularly wish to thank Dr. Bond for his tribute to Dr. Cannon's pioneer work relative to outlining the gastro-intestinal tract with bismuth subnitrate in 1897.

Perhaps many of you have noticed the statement in Dr. Horsley's new textbook on the stomach, in which he calls attention to the fact that approximately eighty per cent of all gastric symptoms are due to some motor dysfunction.

I feel that we have to consider the physiological aspects of every medical problem if we wish to obtain proper results. For instance, if we do not consider the motor dysfunction of the stomach, it is practically impossible to treat a stomach lesion properly.

A careful roentgen examination is necessary to determine deviations from the normal motor function anywhere in the gastro-intestinal tract, but we must correlate our findings with those of the internist, the surgeon and our other co-workers, if we wish to obtain the best results. Failure is frequently due to a lack of adequate consultation with each other.

I always feel a hesitancy in administering thorium to outline the liver, as has been suggested by one of the essayists, for the reason that sufficient radioactivity to harm the patient may eventually result. I do not think our present knowledge is sufficient to warrant its general use, except in the case of patients that are considered incurable.

The finding of air between the diaphragm and the liver, as may be demonstrated on a roentgenogram, is of great aid in determining a perforation in the gastro-intestinal tract and this sign should always be looked for where the condition is suspected.

The roentgenologist can not differentiate with any degree of accuracy between syphilis and cancer of the stomach; nor can he be absolutely positive that an ulcer of the stomach is not malignant. The latter differentiation should be made with the microscope, and surgeons who are doing stomach work should be very careful to make frozen sections at the time of operation and be guided accordingly.

A careful roentgen examination is, however, a fairly good guide as to whether or not a lesion is benign or malignant. For instance, we know cancer is relatively rare in duodenum and lesions not more than 3 c.m. in

diameter and located on the lesser curvature of the stomach are usually benign, while large lesions, particularly those located on the greater curvature of the stomach, or elsewhere, with signs of considerable surrounding infiltration, are likely to be malignant. So roentgenology gives us these guides and if we find an apparently benign lesion we can afford to treat it medically for a while, at least, but don't forget the large number of people who die of cancer of the stomach in this country every year. I personally feel that no physician is justified in treating even a definite ulcer for a long period of time without a roentgenological "check-up," because unless carefully watched a definite percentage of curable cases will lose their chance for recovery.

Finally, I wish to emphasize the fallacy of depending too much upon one negative roentgen examination. A recent case serves well to illustrate this point. A lady was referred to us with definite gastric symptoms and no lesion could be found fluoroscopically, nor on a series of roentgenograms made immediately following the fluoroscopic examination; but due to the symptoms, she was requested to return later for another examination, at which we found a very definite, though quite small, carcinoma. No doubt, the lesion was present when she came to us the first time, but the gastric deformity was not sufficient to be diagnostic.

May I again thank you for this opportunity of discussing this most excellent symposium.

DR. J. SHELTON HORSLEY, Richmond: If we follow those recommendations of Dr. Morton and look upon every prolonged indigestion as potential cancer of the stomach and, unless the symptoms disappear after a few weeks of treatment, have a roentgenologist skilled in gastro-intestinal work make a thorough examination of the patient's stomach, I believe early gastric cancer will be found more frequently and with prompt operation the death rate should be cut in half in five years.

Dr. Wm. Gerry Morgan, the well-known medical gastro-enterologist of Washington, is not particularly enthusiastic about surgery, yet he made the statement before the Southern Medical Association that every peptic ulcer of the stomach is always a surgical condition. I have had patients in whom peptic ulcer has turned into cancer. We cannot ignore that; if we do, we might as well turn Christian Scientist and say there is no such thing as gastric ulcer or cancer. In those gastric cancers with no symptoms until the late stages, the lesion is in the physiologically silent portion of the stomach. About two-thirds of the stomach is physiologically silent, just as much of the brain is physiologically silent. We know that cancer in the mouth, in the rectum, the cervix, and the skin—regions that can be observed—arises from a preceding benign lesion, as an ulcer or a papilloma. It is logical to hold that this rule applies in regions that cannot be directly observed, as the stomach.

Since the first of July I have opened the abdomens of four patients with cancer of the stomach which proved to be unresectable. Now, I am willing to take just as long a chance as any one else, but I could not do anything in those cases. One of them had been resected by me nearly four years before. That left three. One of those three cases had had gastric symptoms for eight years, another for four years, yet they had just had X-ray examinations made recently. If the X-ray examination had been made a few weeks after the first symptoms, the result might have been different.

Dr. Horsley then showed a few lantern slides of the stomach of a man studied by one of the most competent roentgenologists in a northern city and pronounced inoperable carcinoma. Describing the case, Dr. Horsley said: He had high acid in the gastric juice. I told him that he might have cancer, though I was not certain of it, but we might be able to resect it. Sometimes, even in these roentgenologically inoperable cases, we can do a partial gastrectomy and prolong the patient's life and make him more comfortable. You see there the portion of the stomach removed. It was an extensive peptic ulcer that had perforated onto the pancreas. About half of the stomach and the adherent portion of the pancreas were removed. The patient made a good recovery.

Every patient, particularly one over forty years of age, with gastric symptoms, should be considered most seriously, and the obligation is very heavy on the physician if he continues to treat that patient indefinitely without a competent X-ray examination. The only known effective treatment for gastric cancer is surgical excision.

DR. F. J. WRIGHT, Petersburg: This subject has been thoroughly discussed; all the papers are good. I think every man in the society, every man who does general medicine and special medicine, is interested in gastric symptoms. There is one thing I want to mention here that I do not believe has been mentioned. Frequently the early symptoms of tuberculosis are gastric. Don't neglect to examine the lungs thoroughly before you arrive at a conclusion.

Another thing. For perhaps thirty years I have been intensely interested in peptic ulcer. I had a patient about thirty-three years ago that had a tremendous hematemesis and almost bled to death. She was treated conservatively, got apparently well, and lived for six years symptom-free; then symptoms began to develop that indicated organic pyloric obstruction. Had we known then what we know now, had we had the facilities for diagnosing pyloric obstruction, she would have been living today. As it was, we waited too long. She was operated on by one of the most prominent surgeons in the South, and she died, I think, of an acidosis. Had she even at that late day had the treatment that surgeons give now, especially glucose and salines intravenously, she would be living today.

In most cases of duodenal ulcer and, I might say, gastric ulcer, if they are not too large or too extensive and if there is not too much obstruction (you may have considerable obstruction sometimes that is inflammatory

rather than organic and that is relieved by rest, large doses of belladonna, and the proper diet), the modified Sippy diet has, in my experience, been very satisfactory on the whole. In the last few years I have adopted Seale Harris's plan of adding orange juice, grapefruit juice and tomato juice. I still use some alkalis, the base of which is calcium carbonate. I use belladonna freely if there is pain. Of course, I advise a smooth and non-irritating diet. Many cases, as all of us know, come to surgery, and by the use of frequent follow-up roentgenograms or by fluoroscopy I think we can tell and know in which cases operation is necessary. Of course, if there is perforation at any time they should be operated on.

DR. FRED M. HODGES, Richmond: I think all of us will agree that the most important one point in this whole symposium is the early diagnosis of cancer of the stomach. I shall not discuss the radiological side, but I should like to bring out what seems to me the most important point in the diagnosis. Practically all textbooks on medicine today, and all pathologies too, will give you about nine or ten pages of description of the pathology of advanced cancer of the stomach; and the medical student gets this as his training and goes out knowing that obstruction, Oppler Boas bacilli and a mass in the abdomen mean cancer. They do mean cancer, but they mean, in the large majority of cases, hopeless cancer, cancer that is inoperable. What we should get over to ourselves is that there is no typical cancer history. When a patient in the cancer age has an unexplained digestive upset, that patient should have a thorough examination for cancer.

The responsibility, of course, is up to the general practitioner. If he suspects cancer and has the proper examination made, seventy per cent of these cases can be diagnosed in time for operative removal.

DR. J. BOLLING JONES, Petersburg: I don't think we have heard anything particularly new; we have had simply impressed upon us things we have known all the time. It is like telling our sweethearts every day that we love them. So we must tell ourselves these things every day, so as to keep them in mind. I think it has been recognized for years that gastric ulcer is a purely surgical problem, as opposed to duodenal ulcer.

There are two points that are important. Dr. Morton said that hemorrhage always indicates surgery. Of course, gastric ulcer means surgery, hemorrhage or no hemorrhage. I should like him to tell us what is the immediate indication for surgery in dealing with hemorrhage.

The next proposition is very, very vital to me, and it comes home to every man in this audience. It has been stated, and correctly stated, that the court of last resort for diagnosis is the radiologist. I feel competent to do practically everything else in forming a diagnosis; I think all of us can, with the exception of the roentgenological findings. Dr. Horsley has made the point that those findings should be made by a man thoroughly trained in roentgenology. We have a few men only in the state who are capable of making a thorough roentgenological study of the stomach. Not every man can do it. Now, gentlemen, the question of the economic side comes in. Cancer is no respecter of persons. The matter of the economic side comes in very, very forcibly, when it comes down to a thorough roentgenological study of the stomach. I do not blame my professional brethren; I suppose they have to live, it is true; but we all know that the University of Virginia and the Medical College of Virginia have beds for the poor. It occurs to me that we might make some arrangements. The minute we say "X-ray" to our average patient, he says: "Doctor, I can not do it; I just can not pay the bill." Wouldn't it be possible in some way to take the average poor case—could not something be done by which these gastric analyses for the average person could be made—could not some arrangement be made by which we could get the average person X-rayed at one of these institutions at very small cost? I should like to see something done along that line.

DR. J. CARROLL FLIPPEN, University: It is probably very unorthodox for the chairman to discuss a paper, but I have just a few words I should like to say about this subject.

Digestive complaints comprise a very large percentage of the presenting symptoms for which the patient comes to the doctor. Therefore, the group of patients having indigestion form a very important group. Now, an ideal is impossible, as has been shown. If we want to get early cancer, or if we want to avoid mistakes, these patients have to be put through a rather time-consuming and, in many cases, a rather expensive regime. Now, there are not enough X-ray men in all the United States to examine all the people with gastric symptoms, and not enough machines; and, as Dr. Jones has pointed out, many people are too poor to avail themselves of these facilities if there were enough of them. If we do not have X-ray, we are going to have some embarrassing and unfortunate mistakes; but, as I see it, under the present conditions they are bound to occur. So I would emphasize the careful weighing of the history and observations that can be made in the home and at the physician's office. I think that these cases, with study and care, can be sorted out, and that is the only practical way in which it can be done now. Considering the age groups, we always know that we are in greater danger at certain ages. There are many other factors that have to be considered, but I do feel that that is the most important thing—the careful weighing of symptoms and the careful weighing of physical findings, because in so many of our cases gastric symptoms are due to disease somewhere else in the body.

DR. ROBERTSON: I agree very thoroughly with what Dr. Clarkson said about the importance of being sure of a neurosis before we make the diagnosis. I think it is not a word to be used in front of the patient; I think we should speak of it as a functional disorder

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rather than a neurosis, because of its effect on the patient.

DR. MORTON, closing the discussion on his part: I was asked a question about hemorrhage—what type of hemorrhage warrants surgical intervention. Certainly I have never been able to lay down for myself any hard and fast rule. I think the only general observations that can be made are that frequent, small hemorrhages, constantly recurring, would certainly warrant surgery; also a single massive hemorrhage, which indicates the erosion or opening of a large vessel. It is true that granulations may form, the vessel heal over and the immediate danger of hemorrhage subside. But we know that ulcer is a periodic disease. We know that ulcer will go into a stage of further erosion, that some big vessel is there, and that there will be considerable probability of its being opened up again and of the occurrence of another massive hemorrhage. I have seen death ensue, however, in instances which could not be prevented, because the patient was in no condition to stand an operation after the initial hemorrhage or because the loss of blood was so massive and so persistent that it could not be controlled.

I think Dr. Simpson's point about treating the patient rather than the disease is an awfully good one. Many patients with gastric complaints have no organic disease. Whether a victim of organic disease or not, it is very important to consider the patient as a sick person rather than just a case of peptic ulcer or a case of this or that.

What are we going to do to check up on patients with gastric symptoms? It is obviously impossible to have an X-ray examination made on every patient that comes to one's office with some gastric complaint. If so, we would probably be X-raying a large proportion of all our patients. I think, however, that we should observe the rule of X-raying those who have persistent dyspepsia. Rule out the cases of chronic appendicitis, cholecystitis, and so forth, by this means.

I wish to thank those who discussed the papers for their generosity.

FURTHER OBSERVATIONS UPON THE CONTINUOUS INTRAVENOUS INJECTION OF DEXTROSE IN RINGER'S SOLUTION.*

J. SHELTON HORSLEY, M. D.,
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One of the many problems that concern both the general practitioner and the surgeon is the dehydrated patient. The dehydration may come from many sources. An excessive output of fluid, as in pernicious vomiting or in diarrhea from enterocolitis, or an insufficient intake of fluid, whether from a natural disinclination to drink fluids or from an inability to absorb them, or a combination of these sources, may cause dehydration.

There are several ways of treating this condition. Naturally, the most satisfactory method would be drinking water. The next would be the absorption of water by proctoclysis. If neither of these methods is possible, the administration of water by hypodermoclysis or by intravenous methods is indicated. In hemorrhage, the demand for water is immediate and urgent.

In shock, with or without hemorrhage, the capacity of the terminal vascular endothelium to retain ciates, of Vanderbilt, showing that traumatic or surthe serum of the blood is diminished and much fluid leaks through into the tissue spaces. Excellent work has been done by Blalock and his associated shock is usually chiefly due to this loss of fluid and not to a hypothetical histamin-like toxic product supposed to be created by maceration of muscle and other tissues.

In all of these conditions the necessity for supplying water and the desirability of also giving the normal electrolytes of the blood together with some nutritive substance, as dextrose, are obvious. If these three things are combined, the patient is in better condition than if only water, which is undoubtedly the most important of the three, be administered. In diseases of the liver carbohydrates are particularly indicated. Incipient or even mild degrees of hepatitis are often difficult to detect. The tests for diseases of the liver are by no means as satisfactory as the tests for the function of the kidneys. The fact that the liver has at least six different functions, all of which are vital, greatly complicates the situation and the retention of bile in the blood as shown by jaundice is too often accepted as the chief or the sole sign of liver dysfunction.

In children who have violent attacks of enteritis, dehydration may come suddenly. Usually when there is an acute need for supplying water, and the

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electrolytes of the blood (sodium chloride, potassium chloride and calcium), the natural method of absorption through the stomach and bowel is not sufficiently rapid and the gastrointestinal disturbance accompanying the disease frequently prevents not only retention of water in the stomach but a satisfactory absorption even if it is retained. It is well known that most of the water taken into the system and a considerable amount of the salt are absorbed from the cecum and the right half of the colon. It has been the subject of considerable dispute whether the colon absorbs any dextrose. Formerly the so-called nutrient enemas were much in vogue. McNealy and Willems have shown that in a dog dextrose is not absorbed through the colon, though water and salt are rapidly taken is incompetent, however, and the nutrient material is carried into the lower ileum, absorption of it may take place to some extent, though this process is more rapid in the upper portion of the small intestine than in the lower.

Ebeling has carried out interesting experiments and reviewed the literature in regard to the absorption of dextrose from the bowel. He concludes that "When a marked dextrose deficit occurs in the blood, dextrose can be absorbed from the colon approximately as rapidly as it can be from a low ileal loop of the non-insulinized dog. The presence of dextrose in the solution in the colon, in the concentration used, causes a retardation in the rate of water absorption. The total amount of dextrose which can be administered and absorbed from the colon under the best conditions would appear to be too small for any considerable immediate therapeutic effect."

Althausen has shown that "In diseases of the liver, insufficient gluconeogenesis causes 'internal' carbohydrate starvation, which results in a reduction of hepatic glycogen, probably largely through depletion of that part of it which serves as a storage form of carbohydrate. * * * Both in experimental animals with hepatic damage and in patients with diseases of the liver, it is possible by administration of suitable amounts of dextrose to relieve the internal shortage of carbohydrate and, as a result of this, to bring about glycogen storage. * * * Dextrose therapy is indicated in all cases of primary and secondary hepatic disease."

It is well known that if an Eck fistula is made in dogs in which the portal vein is united to the vena cava, so sideswitching the portal circulation and carrying the blood absorbed from the intestine directly into the vena cava instead of into the liver, the recovery may be satisfactory and the dog kept in fairly good health on a diet of carbohydrates. If, however, large quantities of meat proteins are given, the dog soon dies, usually with symptoms indicative of a cerebral death. Much interesting work has been done upon this subject, and while the conclusions are not quite definite, it appears to be demonstrated that the liver has a function in detoxicating the protein derivatives of meat which are absorbed through the intestine and which if carried directly into the general venous circulation have a marked toxic effect. It is seen, then, that aside from the value of water for purposes of general metabolism and the importance of dextrose for calories, the dextrose also has a protective effect upon the liver. A diseased liver functions imperfectly and may not be able satisfactorily to detoxicate the products of meat proteins and it becomes essential then to give the liver physiologic rest by supplying a diet of carbohydrates which calls for comparatively little liver activity aside from the storing up of glycogen. Aside from the obvious necessity of supplying water, nutrition and the electrolytes, the protection of the liver and the conservation of its function are extremely important.

In many of the acute infectious diseases, and in the diseases which dehydration accompanies, there may be a hepatitis. Many years ago Evarts Graham demonstrated that cholecystitis is practically always accompanied by hepatitis, and it is well known that marked disease of the kidney is usually associated with some affection of the liver. Insidious lesions of the liver, such as fatty degeneration, may exist without obvious signs for many years, and the occurrence of a crisis such as an accident or a surgical operation may be followed by an unexpected death, when a necropsy will often show the liver extensively impaired. It would be playing safe to assume that in any particular crisis the liver should be protected by supplying not only water and the electrolytes but dextrose.

MacNider, of the University of North Carolina, has shown in interesting experiments that in dogs predisposed toward nephritis the kidneys may be largely protected from the effects of ether anesthesia by the intravenous injection of 5 per cent dextrose in Ringer's solution or by a 2 per cent solution of

bicarbonate of soda in Ringer's solution. The administration of anesthetics by rectum, such as avertin, which is absorbed directly through the portal circulation and passes to the liver, may have an irrigating effect upon the liver. MacNider, while he has done no experiments to demonstrate this point, thinks it is probable that the liver may also to some extent be protected from the irritating effects of the anesthetic by giving 5 per cent dextrose in Ringer's solution.

The value of sodium chloride in the blood is obvious. Haden and Orr have shown that in high intestinal obstruction there is a deficit in chlorides and a rise in the blood urea, and the patient's safety can be greatly enhanced by the administration of sodium chloride. Calcium is also important. Not only does it tend to aid in the heartbeat, stimulating the systole while potassium seems to have a somewhat antagonistic effect in its action on the diastole, but it appears also to lessen the permeability of the vascular endothelium in the smaller vessels and so to retard the rapid flow of fluid from the dilated capillaries into the tissue spaces, which is a prominent feature of shock.

Harry J. Warthen, Jr., of Richmond, Va., has carried on some very interesting experiments concerning the amount of fluid that could be given dogs intravenously. A series of experiments was made in which normal dogs received physiological salt solution, 5 per cent dextrose solution, hypertonic (1.5 and 2 per cent) salt solution and 10 per cent dextrose solution intravenously. Changes in the blood chemistry were noted by determinations of the non-protein nitrogen, blood sugar, and blood chlorides before and after the injection of various amounts of the above solutions.

Large amounts of fluid could be given intravenously within a relatively short time without causing untoward symptoms. One dog weighing 9.5 kg. received 2,000 c.c. of 5 per cent dextrose (slightly more than one-fifth of its body weight) within seventeen minutes, without showing any circulatory embarrassment aside from a marked increase in the pulse rate and a rise in the venous pressure. This is equivalent to thirteen or fourteen liters of fluid for an adult human of average size, or about fifty times the amount of fluid which would usually be injected in the same period of time. The average amount of fluid given to twenty-eight dogs was equivalent to seven or eight liters of solution for an adult weighing 65 kg. Only one dog died, and this was due in part if not entirely to the large amount of 10 per cent dextrose injected without insulin, rather than to the actual amount of fluid given.

The changes in the blood chemistry aside from the diluting effect of the fluid were not remarkable with the exception of the blood sugar after 5 and 10 per cent dextrose injections, which naturally rose markedly depending upon the amount of insulin given to cover the sugar.

This work of Warthen's indicates that a much larger quantity of intravenous fluid can be given normal animals than is usually believed. However, under any circumstances, the general clinical aspect of the patient should be carefully noted and the amount of intravenous fluid regulated.

In reviewing the facts, then, the normal method of administering fluids through the mouth if available is the most satisfactory, but in many conditions this is difficult or impossible, as in some cases of dehydration, in shock, after certain surgical operations, in affections of the liver, the vomiting of pregnancy which also doubtless means an affection of the liver, and in gastroenteritis. The administration of water and salt by proctoclysis is a valuable method and is often helpful, but in enteritis this, of course, is out of the question. Besides, it is doubtful if any dextrose is absorbed through the colon. Dextrose is not well absorbed through hypoclysis, and the intravenous method often seems to be the one indicated.

The intravenous injection of dextrose in Ringer's solution has been somewhat handicapped by the apparent difficulty of the technic of administration and of making the solution. This has been very largely obviated, both in the surgical procedure and in the preparation of the solution. Formerly it was considered that the water must be distilled with meticulous care in a special glass still, usually two or three times, and even then occasionally there would be a chill.

Matas first advocated the intravenous administration of 5 per cent dextrose, as 5 per cent dextrose is about isotonic with the blood. We have added to this, Ringer's solution, which comprises the chief mineral elements of the blood plasma, sodium chloride, potassium chloride and calcium. The advantages of these elements have already been discussed. We have had an ampoule prepared which

contains a concentrate of dextrose and Ringer's solution in such a strength that 100 c.c. of the concentrate in the ampoule when placed in 400 c.c. of distilled water will make 500 c.c. of 5 per cent dextrose in Ringer's solution. The distilled water should be preferably not older than twenty-four hours, though if it is hermetically sealed it may be kept indefinitely. It is made in an ordinary copper still used in the laboratory.

If the solution is permitted to flow at not more than 150 c.c. an hour it may be run indefinitely. This solution may be administered through a hypodermic needle; we use a No. 20 gage, stainless steel needle, one and one-half inches (3.7 cm.) long. If it is to be continued more than twelve or fourteen hours, it is better to run it through a cannula which has ben devised by Guy W. Horsley and me. The lumen of the cannula is large and clear throughout, which lessens the chances of its being stopped up. The base of the cannula is ground to fit an ordinary Luer syringe, and if a transfusion is necessary it can be given through the cannula, and the solution again continued after the transfusion. After operations upon the stomach we usually insert the cannula and keep the solution running for two days or longer. This is less objectionable to the patient than proctoclysis, is readily controlled, and gives an amount of dextrose and calories that could not be possibly administered through the bowel. At the same time it affords physiologic rest for the stomach and intestines. In peritonitis, while proctoclysis is helpful, it undoubtedly stimulates to some extent the peristalsis and consequently to this extent is undesirable in not affording physiologic rest to the bowel, which should be one of the essentials of treatment in peritonitis. The well known danger that follows the administration of purgatives or enemas in acute appendicitis shows the necessity for inhibiting peristalsis and not stimulating it when there is any inflammatory abdominal condition.

We use a buret 54 cm. long in which 100 c.c. of fluid are contained in 9.2 cm. of the length of the buret. The flow can be regulated by a screw clamp from 50 c.c. an hour up to as much as it may be necessary to give quickly when shock occurs. In this way the danger of the entrance of air into the vein is largely obviated, while a constant rate of flow is maintained.

The rubber tubing should be boiled, stretched and twisted or beaten before and after being boiled, and sterile water run through it, in order to remove deposits that may cause a reaction. Special rubber tubing can now be obtained for this purpose. New rubber tubing is boiled for an hour in strong solution of soda, rinsed in running water and then boiled for an hour in tap water. At the end of the tube is a small connecting tip or metal adapter (or nipple) which fits into the hypodermic needle of a Luer syringe. A glass tube is inserted near the end of the rubber tube. All glass used in preparing the solution is pyrex, and new glass is thoroughly washed before using it. The whole apparatus is best sterilized in an autoclave or an oven.

If shock is present, and the blood pressure low, or if there is hemorrhage, the intravenous solution should be run in rapidly, sometimes as much as 400 or 500 c.c. in a few minutes, until the blood pressure comes within ten points of the approximate normal for that patient. In such patients there can be no danger of over-straining the heart, for the heart functions poorly solely because of the need for fluid in the vascular system. In these cases, when the blood pressure becomes nearly normal the solution should be run slowly.

In elderly patients the solution should be given cautiously. If there is a tendency toward raising the blood pressure too much it should be discontinued. In nephritis the solution may be increased to 10 per cent and the Ringer's solution may be omitted. The giving of highly concentrated dextrose as formerly recommended for uremia and for edema of the brain is probably unwise, 10 per cent being sufficiently hypertonic in most instances. In other conditions which have been mentioned, dehydration, vomiting, enteritis, sepsis, liver affections, this 5 per cent dextrose in Ringer's solution is best given over a period of hours or days at a rate of flow of 100 to 200 c.c. per hour.

CONCLUSIONS

In dehydration from any cause, in shock, hemorrhage and the vomiting of pregnancy, in affections of the liver, in intestinal obstruction and in a fistulous opening from the upper intestine and stomach where a large quantity of fluid and of the electrolytes is lost, the intravenous administration of 5 per cent dextrose in Ringer's solution is very valuable. In surgical operations, and particularly in shock or in spinal anesthesia, it is of great help.

In prolonged operations it should be instituted

at the beginning of the operation and the flow regulated so as to prevent the blood pressure from falling too much. It is particularly valuable in spinal anesthesia. If there is marked loss of blood, or if the pressure cannot be maintained in this way, a transfusion of blood can be given through the same intravenous cannula, and the dextrose in Ringer's solution again continued.

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DISCUSSION

DR. R. L. RAIFORD, Franklin: We feel gratefully indebted to Dr. Horsley for summarizing and simplifying the method of giving a remedy which has proven to be of so great value in such a variety of conditions. Since the dawn of modern medicine, there have been very few specific remedies developed and perfected. Many cases in which we have used the combination of Dextrose and Ringer's solution, especially in emergencies, the improvement has been so marked, so positive and so spectacular, that we might well classify this preparation, when carefully administered under proper conditions, as a specific. We first began its use in post-operative cases, but have since gradually drifted into using it in almost all types of cases where there is an urgent need of water and food in the system. We have used it in persistent hiccoughs with most spectacular improvement. Cases of extreme acidosis and persistent vomiting often clear up like magic under its judicious use. We use a smaller burette, with a glass adapter, and regulate the flow by the height of the burette and the size of the needle. A small laboratory still gives us freshly distilled water very quickly. I mention this not as an improvement over the method Dr. Horsley uses, but to bring out the idea that with very simple apparatus you can administer the solution properly almost anywhere, and under almost any circumstances.

In closing, let me say that in desperate cases this remedy will often change defeat into victory and help us to save lives where everything else has failed.

DR. H. J. WARTHEN, Richmond: Experimental work has been done on dogs in which various solutions were injected. The original purpose of this work was to determine the chemical changes that took place after various solutions of sodium chloride and dextrose were injected. It was found that the chemical changes were not so marked; they were largely what one would expect, due to the diluting effect of the fluid. One interesting observation was that the fragility of the red cells was not altered by one of two liters of sodium chloride or dextrose solution being injected in a dog of average size. We became more interested later in determining the amount that could be injected without causing symptoms or death, and increased the amount from time to time, and apparently the only limit was the amount of solution that had been prepared. We did this under local anesthesia, and the dogs were permitted to run around immediately following the experiment and showed no effect except a little awkwardness due to their increased weight. Of course, in humans we would not recommend such heroic doses, but it is comforting to know that we can use large quantities without producing untoward results.

Question—(DR. FLIPPIN): Did any of the dogs show edema after the injections

Answer—No dogs showed evidence of edema.

DR. A. I. DODSON, Richmond: I have found the administration of dextrose very helpful in the preparation of patients for operations upon the hypertrophied prostate. The mortality in this class of patients is admittedly higher during the period of preparation for prostatectomy than following the operation. They frequently enter the ward in very poor condition, badly nourished, dehydrated and often in a condition of mild uremia. The institution of catheter drainage or suprapubic drainage causes a temporary diminution in the kidney function and sometimes an increase in the local infection. The administration of dextrose serves as an excellent means to boost them over this crisis. The continuous administration of dextrose necessitates constant attendance at the patient's bedside. For this reason, in our ward patients in the Hospital Division of the Medical College of Virginia, we customarily give the dextrose more rapidly in amounts of 1000 c.c. to 1500 c.c. once or twice a day, and those

patients with cardiac conditions in whom we are afraid to administer so much fluid at so rapid a rate, we usually give concentrated dextrose intravenously and normal saline by hypodermoclysis.

DR. HORSLEY, closing the discussion: I have been asked who makes the ampoule. I have not enough chemical knowledge to work out the details, but I told a chemist, Dr. Carter, of the Swan-Myer Company, what I wanted and he worked out the chemical details.

Referring to Dr. Raiford's discussion, I am not stickler for any particular method of getting the fluid in. This cannula has been found, in hospital practice, satisfactory, because the solution can be run in more slowly than with the needle. The needle will sometimes stop up, but for a few hours it is satisfactory. If there is marked loss of blood, a transfusion may be given through the cannula.

In edema ten per cent hypertonic dextrose solution without the Ringer's solution may be used.

In patients with high blood pressure, intravenous dextrose in Ringer's is not well tolerated. If the blood pressure goes up and tends to stay up, the intravenous solution should not be continued. Try giving a hundred c.c. an hour, and if the blood pressure does not go up more than ten or fifteen points in a few minutes, or certainly a half hour, it can be used cautiously in that manner.

Patients with prostatism often need this intravenous solution badly and it is very beneficial to them.

It is important to keep up the blood pressure. If a patient goes into severe shock from hemorrhage and low blood pressure he will usually die. In serious operations and in spinal anesthesia, we put in the cannula at the very beginning of the operation and try not to permit the blood pressure to fall more than twenty points below what would be normal for that patient.

CORONARY THROMBOSIS—REPORT OF A CASE WITH SOME COMMENTS ON DIAGNOSIS.*

E. G. SCOTT, M. D.,
Lynchburg, Va.

Coronary thrombosis in its typical form is one of the most dramatic diseases in the field of medicine. A man in the fifties or sixties may be in apparently perfect health when the disease strikes. Within a few minutes he is in a state of shock with an agonizing substernal or epigastric pain, obviously desperately ill. Most cases of so-called acute indigestion are now known to be really instances of this condition. Physicians seem especially prone to suffer from angina pectoris and coronary thrombosis. Osler[1] lists a number of physicians and other prominent men who have died of angina pectoris. Undoubtedly, coronary thrombosis is the cause of death in most cases that supposedly die from angina. Just recently a former president of the United States and a senator who had been selected for the post of attorney general have succumbed to it.

Long before coronary thrombosis was recognized clinically, pathologists were familiar with it as an infarct or in the later stages as myomalacia. Dock[2] was the first in America to report a case of coronary thrombosis diagnosed ante-mortem and proven at autopsy. This was in 1896. Almost twenty years earlier, however, in 1878, Hammer[3] had reported the first recorded case diagnosed in life and proven at autopsy. In 1912, J. B. Herrick[4] clearly presented the symptoms of the disease in a paper entitled "The Clinical Features of Sudden Obstruction of the Coronary Arteries." Since then papers on the subject have been very numerous. One of the best recent articles summarizing our existing knowledge of the subject is by Austrian.[5] For a more complete account, see the excellent monograph by Levine,[6] which appeared in 1929. Some of the more recent additions to our knowledge of coronary thrombosis are:

1. The possibility of determining by electrocardiograms whether the right or left coronary artery is affected.[7-8] This affects our prognosis, since occlusion of the left coronary is of more serious import than is that of the right.

2. Recognition of the relative frequency of attacks without pain.[9] Often a sudden attack of dyspnea or cardiac asthma is the first symptom.

3. The use of a chest lead (lead 4) in cases with negative or inconclusive electrocardiogram.[10-11-12] In some cases the typical electrocardiogram changes are seen only in lead 4. Katz and Bohning[13] have called attention to electrocardiographic signs other than the coronary T-wave of Pardee. Rapid changes

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in the form of the electrocardiogram are just as significant as the typical T-wave and S-T interval. The electrocardiogram may change markedly in the course of the first twelve to thirty-six hours after an attack.

4. The use of oxygen in the treatment of acute stage. Barach[14] reports two cases where this was undoubtedly a life-saving measure.

The usual clinical picture is very typical: Sudden very severe substernal or epigastric pain requiring large doses of morphia for relief, shock with pallor and sweating, weak heart sounds, heart arrhythmias, a fall in blood pressure, later fever and leucocytosis, sometimes a pericardial friction rub. We should always be on our guard however, for the atypical case. None of the above symptoms are invariably present. The one pathognomonic sign is a characteristic tracing with the electrocardiograph which, when present, clinches the diagnosis, but even this is not always present.

The following case which was followed for three and one-half months and autopsied, presents some interesting features.

J. H. S., age 81, white, male, was seen the morning of December 18, 1932. His complaint was that during the night he had sharp pains in the base of his neck, changing from place to place. His past health had always been excellent. Two years previously he had an operation for a diverticulum of the esophagus on the left side. Since then he has been troubled off and on with uncomfortable sensations in his neck and had thought on several occasions that the old trouble had returned.

He had been under observation for two years previous to the last illness, and on several occasions frequent premature beats with occasional short runs of tachycardia had been noted. The family history was unimportant.

Physical examination showed T. 98, P. 52, apex rate 104, every other beat being a premature contraction. There were occasional short runs of paroxysmal tachycardia. The diagnosis was premature contractions and paroxysmal tachycardia. On the next day the pulse was 72 with only occasional premature beats. The following morning he complained of a sense of pressure in the chest and said he was short of breath. The respirations were 24, and the pulse totally irregular, as was the heart, the rate being 116. There were a few crepitant rales at each base; liver edge not felt; no edema. The diagnosis of auricular fibrillation with beginning congestive heart failure was made. He was put on quinidine sulphate, grs. 4, every eight hours. The following day, fourth day of illness, the pulse and heart were regular, rate 72, breathing was better, color good. On the fifth day, the heart was fibrillating again, respirations were 28, T. 99.5, and he was slightly cyanotic, rales in the lungs were more numerous. Quinidine was increased to 4 grs. every four hours night and day, and digitalis was started. Pulse improved in strength and became slower; heart sounds noted to be soft. On the eighth day pulse was regular, 68, respirations 24; over heart was a wide area of friction rub. The diagnosis was now recognized to be coronary thrombosis, which would explain every symptom and sign. On the eighth day of illness he had a stroke involving the right side. He had evidently had a cerebral embolus from a mural thrombus. Next morning fibrillation was again present, bladder was distended and had to be catheterized. The following note was made on January 4th, eight days after the cerebral embolus:

"Have seen once or twice daily since having stroke. Patient recovered use of right side of body in a few days and the mentality cleared remarkably, being able to understand perfectly well, but unable to speak distinctly; had fever for three days after stroke, then normal. Indwelling catheter removed yesterday; heavy albuminuria and pus, with few blood cells present on urinalysis today. The heart has been totally irregular, rate held to between 80 and 90 with digitalis. This morning for the first time it is regular, rate 72. Nausea and vomiting present today and had diarrhea last night. Digitalis was stopped. Last night while unobserved he got out of bed and walked to the door. Friction rub was only heard two days. Afternoon of the sixteenth day, not as well; more stuporous; temp. 101.5; vomiting everything; faint friction rub over heart; rhythm totally irregular; has probably had second infarct."

He was removed to Virginia Baptist Hospital where he remained for three weeks. Hiccuping and distention were troublesome and almost constant symptoms for two weeks. Cheyne-Stokes breathing was present during most of this time. With infusions and forced fluids his condition improved gradually. One week after hospital admission, the N. P. N. had fallen from 66 to 31 mgms.

per 100 c.c. The pulse had become regular. He recognized people and understood what was said, but could not speak intelligibly A few words and phrases could be spoken, such as "yes," "no," "probably so," "I think so." Otherwise, his conversation was a jargon of syllables that sounded like some foreign language. Certain phrases or syllables would be repeated over and over. He seemed not to know that his speech was not understood. One week after returning home he was sitting up in bed. By the middle of February he was up walking a little. Pyuria was still present; the pulse remained about 70, was regular and of good quality. His speech did not improve. Spells of excitement became very frequent. During these he woulud "talk" constantly for several hours. Sedatives were required. On March 13th the blood pressure was 140/80. On admission to hospital January 4th this had been 150/70. From the middle of March his mental condition grew progressively worse, and he took very little fluids. Heart examination revealed no abnormality except rather soft sounds and a short soft systolic murmur at the apex. The pulmonic second sound was more distinct than the aortic. On April 8th, a few minutes after midnight, he died suddenly.

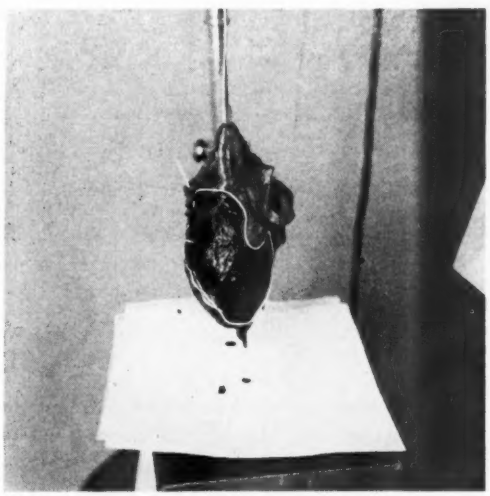

Fig. 1.—Left lateral view of heart showing size of infarcted area.

Autopsy was essentially negative except for the heart and brain. On opening the pericardium it was found to be adherent to an old blood-clot in the form of a layer one-half inch thick which lined the pericardium all way around. The pericardial sac was filled with about twelve ounces of freshly clotted blood. This was removed and revealed a heart of normal size. The left side was dark in color over an area the size of a man's hand and had a vertical tear in the left ventricle about one and one-half inches in length (Figure 1).

The heart was removed and on cutting through the aorta there was found a small sacculated area in its wall about three inches above the valves; this was cut through on removing the heart, and was evidently a small sacculated aneurysm. It was filled with organized blood-clot. The heart cavity was not opened.

Fig. 2.—Left lateral view of left cerebral cortex; arrow points to area of softening.

The lungs were normal, as were the abdominal viscera. There was moderate arteriosclerosis of the aorta. The brain was removed and showed a depressed, very soft area the size of a nickel in the left cerebral cortex just above the anterior end of the Sylvian fissure—Broca's convolution (Figure 2). The arteries at the base showed marked arteriosclerosis. The brain was not sectioned.

COMMENT

Pain was not an outstanding symptom. No opiate was required. Davis,[9] in an analysis of 165 cases, found 66 (40 per cent) without any history of pain.

Instead of pain the presenting symptom is often a sudden attack of dyspnea. I have recently seen a case that began with an attack of cardiac asthma

without pain. Death occurred suddenly on the eighteenth day.

Cardiac arrhythmia is a frequent finding after coronary occlusion. Frequent premature beats is the most common irregularity, auricular fibrillation next. Both were present in this case. Heart block, and ventricular tachycardia sometimes occur. It is well to consider at least the possibility of coronary thrombosis in any case that suddenly develops an arrhythmia, especially when signs of cardiac failure are present. Ventricular fibrillation is undoubtedly the cause of death in many cases.

Fever and leucocytosis are most helpful signs. They are almost invariably present, although often of slight degree. It is best to take the rectal temperature as a fever will often be recorded when the mouth temperature is normal. Any angina-like attack that is followed in a day or two by fever and leucocytosis, is usually due to coronary thrombosis.

Blood pressure readings were not carefully recorded in this case. The drop in blood pressure is most marked in hypertensive cases. It is not an invariable finding. There may be no drop at all, presumably in cases where only a small area of heart muscle is affected. In cases with shock, the pressure is of course low, rising to some extent with recovery from shock. It may then fall for the next two or three days, later rising with recovery of the cardiac function, though seldom to the former level.

Shock was absent. This and pain are the two chief symptoms, and, both being absent, the diagnosis was not certain until later signs revealed the real pathology. A friction rub is present in 15 to 20 per cent of cases, and should be carefully listened for in suspected cases. It may be present for only a few hours. When present, it is of great diagnostic value.

Dyspnea was well marked, and there were signs of congestion in the lung bases, although peripheral venous engorgement and cyanosis were absent. This is a frequent finding. The reason is probably that in most cases the left ventricle is affected, causing signs of left ventricle failure. The right ventricle is able to function more normally than the left. This causes engorgement of the pulmonary vessels with consequent diminution of the alveolar spaces. The systemic vessels, however, are not engorged, because of lack of propulsive force from the left ventricle. Other factors also undoubtedly play a part.

Embolism is most common from the fourth to fourteenth day. Since the left ventricle is most often involved, it is commonest in the systemic arteries. It occurs in the spleen, kidneys (red cells in the urine), brain or extremities Where thrombus formation occurs in the right ventricle pulmonary infarct may occur. In this case presumably a small embolus lodged in the artery supplying Broca's convolution, the motor speech center.

Rupture of the heart is not an unusual mode of exit for these cases. According to Lewis,[15] it usually occurs from the fifth day to the fifth week. In the case here reported it occurred three and one-half months after the original infarct and three months after the second infarct. He was observed daily and there was no reason to suppose that he had another attack of coronary thrombosis within three months of his death. Sometimes an aneurysmal pouching of the ventricle occurs with later rupture of the aneurysm. There was no sign of this in the present case. The hiccups may have been due to irritation of the phrenic nerve as it passed the pericardial sac. The aphasia present in this case was of the motor type. Speech understanding was unaffected, certainly at first, but proper articulation was affected. The speech center of the brain in right handed people is on the left side of the brain and is not sharply defined, but covers a large area of the cortex above and below the anterior end of the Sylvian fissure. There are different names given to various affections of the speech center, but it is sufficient for practical purposes to classify all cases as either motor aphasia or sensory aphasia. This case is clearly one of motor aphasia since speech understanding (by ear) was unimpaired but speaking was impossible, although the tongue was not paralyzed. The patient could not understand writing or printing, nor could he write.

SUMMARY

A case of coronary thrombosis is reported in a man 81 years old. There was little or no pain and signs of shock were absent, auricular fibrillation and congestive heart failure being the most prominent signs. Cerebral embolism followed by motor aphasia occurred on the eighth day. Death occurred suddenly three and one-half months after the original attack. Autopsy showed an old infarct in the left ventricle with ruptured heart and hemopericardium. There was a soft depressed area

in Broca's convolution in the left cerebral hemisphere.

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DISCUSSION

DR. H. B. MULHOLLAND, University: I think Dr. Scott has presented a very interesting case. One of the most valuable points in the presentation is the fact that the typical symptoms are lacking. In spite of our recognition of typical attacks of coronary thrombosis, with pain radiating down the left arm, or down both arms, autopsy records will show that still a good many cases die of coronary thrombosis without being diagnosed during life. It should be emphasized that in a person over forty years of age with very persistent dyspnea, or sudden onset of dyspnea, we should suspect coronary thrombosis and search for some of the signs brought out in this case—pericardial friction rub, slight temperature, etc. There is one sign that I did not hear mentioned, that is gallop rhythm, especially gallop rhythm appearing in the heart with low blood pressure or falling pressure.

It is very unusual that a man eighty-one years of age should have had an attack of coronary thrombosis and live for three months. Many old people with coronary thrombosis do not die immediately, but a great many of them will die of uremia. Their kidneys cease to function, they put out very little urine, the blood urea goes up, and uremic coma results.

Another point brought out in this paper is the fact that we often find changes in rhythm. Auricular fibrillation, of course, is frequently seen. One case seen recently had heart block and in a very short time apparently had a secondary occlusion and died within about an hour or two afterwards.

I am glad to have heard Dr. Scott present this case, because of the interesting series of incidents, cerebral embolus and rupture of the heart.

DR. N. G. WILSON, Norfolk: The case reported by Dr. Scott is unusual, in that there was none of the usual tearing, agonizing pain under the upper portion of the sternum, the occurrence of which is so characteristic of dissecting aneurysm at the first part of the aorta.

As remarked by Dr. Scott, it is very wise to look for the unusual in the development of this condition. In coronary occlusion, pain may be felt in almost any portion of the chest or abdomen. At the present time I have under observation a man forty-seven years of age, in whom the first evidence of cardiac disease was an attack of acute agonizing pain at the base of the chest posteriorly, extending up and into the neck. This lasted only about ten minutes and was attributed to myalgia. Physical examination immediately afterwards—which, unfortunately, did not include an electrocardiogram—was entirely negative in findings.

Three days later a second attack occurred, the pain being of the same character and in the same location, and it proved to be due to coronary occlusion. A friction rub was heard on the fourth day, lasting about twenty-four hours. There was present also a phenomenon which I have frequently observed in this condition. That is a splitting of the first sound at the apex, which disappeared with improvement in myocardial tone.

With no intention of criticizing Dr. Scott's treatment of this patient, I feel impelled to remark that I have never had the temerity to give quinidine to a patient presenting the condition he describes.

XUM

DR. SCOTT, closing the discussion: I thank these gentlemen for their discussion of my paper.

It is true I did not mention gallop rhythm. I think, Dr. Mulholland, the type of gallop rhythm you speak of is the presystolic gallop rhythm, in which the first sound is reduplicated. I think this is probably due to delay in closure of the auriculoventricular valves of the weakened ventricle. I do not know whether that is true, or not.

As to giving quinidine in the beginning, in this man, it seemed that congestive failure was the pressing symptom at the time the quinidine was given; and in a case where we know the fibrillation has been present for only a short while, I do not think we are running any special risk. The danger, of course, is in loosening an auricular clot. In most of these cases the clot is certainly in the ventricle.

It is interesting to note that very often coronary thrombosis seems to run in families. The sister of this patient, who is eighty-four years old, had an attack a week ago of this same condition. Then I have in mind another family, four members of which have had coronary thrombosis. Three have died, and one is still living.

THE X-RAY IN THE DIAGNOSIS OF PERFORATION OF STOMACH AND INTESTINE.*

M. H. TODD, M. D.,
Norfolk, Va.

Acute perforation of the stomach or intestine occurs either from ulceration, or from injury of some sort. It is vital to make the diagnosis in an early stage, long before symptoms of peritonitis arise, such as distention, fever, rapid pulse, Hippocratic facies, etc.

Quite often the early diagnosis of perforation from ulcer is perfectly clear, because the patient has very severe pain, with exquisite tenderness, and a board-like rigidity of the muscles that is impossible to relax, a rapid rise in the leukocyte count, and often an antecedent history of indigestion; and the early diagnosis of perforation from injury may be perfectly clear because of external wounds that show a manifest involvement of the viscera.

But except for the location of wounds, it may be uncertain for many hours whether any intestinal damage has taken place. There may be at first only moderate tenderness, with no change to speak of in the pulse and very little in the patient's general appearance. The wounds may be around in the flank, or in the lower part of the chest, as after attempted suicide; or a knife-wound may or may not have penetrated deeply through the abdominal wall, so that it is quite impossible to say whether the intestine has been damaged or not. Further difficulty is presented by patients who have sustained only a contusion, without any penetrating wound at all; for the clinical findings may be rather mild, and yet perforation may have taken place. More than one man has lost his life from a mule-kick because—in the absence of any very great soreness, or any notable rise in pulse, or change in facial expression for many hours, or a day or so,—intestinal injury has hardly ever been suspected. Of course, later, peritonitis has appeared, with all its signs in orderly sequence, easily diagnosed; but then it has been too late.

In typhoid perforation, there is generally increased pain, as well as suggestive alterations in the pulse and temperature curves; but the patient may be very dull and apathetic, and complain little, so that the question of perforation may be in doubt for some time.

The point I am making, is that the diagnosis of gastro-intestinal perforation is quite often a difficult one to make in an early stage, when it is imperative for operation to be done if the patient is to recover. In case of reasonable doubt, exploratory laparotomy is of course to be performed; but this is undesirable if no perforation exists, because it adds to the patient's burden, which he may be poorly enough able to stand as it is. Faced with this kind of problem, with no aid from clinical signs, what can be done to help matters?

It is in such cases of difficulty that I wish to call attention again to the use of the X-ray. This method of diagnosis has been described by a number of writers, including DaCosta in his recent text; it depends on the fact that when the bowel or the stomach is ruptured or perforated, gas will usually escape from the opening, and float free in the peritoneal cavity, where it can be detected as spon-

*Read before the sixty-fourth annual session of the Medical Society of Virginia, at Lynchburg, October 24-26, 1933.

taneous pneumo-peritoneum. The procedure, while well vouched for by good authority, does not seem to have come to the attention of the profession generally, some recent articles on abdominal emergencies not even mentioning it. This is the reason for the present paper.

The method is, in brief, to steady the patient for a moment in the sitting posture, and then take an horizontal X-ray film to show the top of the liver, so that any gas collected under the diaphragm will be clearly seen.

Other ways of detecting free gas are very inaccurate by comparison,—for instance, the attempt to demonstrate loss of liver flatness by percussion, as we were all taught to try to do in typhoid perforation. In such a way, only quite gross amounts of gas can be detected, whereas, a very few c.c. are unmistakeably evident by X-ray, and, further, free gas may be shown very early, even an hour after injury.

In 1927 I recorded my personal experience with the method, concluding that it was very nearly diagnostic, whether positive or negative; though stating, of course, that laparotomy was not to be delayed if collateral signs reasonably indicated it.

Since then I have seen two cases in which no gas escaped at perforation of duodenal ulcer, apparently for the reason that the opening was posterior, and as the patient lay on his back, no gas floated up and out into the general peritoneal cavity. Fortunately, in both cases the clinical signs were unmistakeable, and operation was not delayed for a moment, X-rays being taken only as a possibly confirmatory measure. Perhaps, if such a case were doubtful clinically, it would be proper to cause the patient to turn on his face for a little while, so that gas might more easily escape from the posterior opening.

I recently sent a questionnaire to thirty of the larger Eastern hospitals, asking their opinion of the procedure. There is a curious discrepancy in the replies, which indicate that some hospitals do not know of the method, others find it of help sometimes, while others depend on it a good deal in cases of difficulty. I append a table noting these opinions. On the average, the thought is that where there is gas to be seen in the film, free under the diaphragm, there is perforation; where none is seen, not too much dependence must be placed on the negative X-ray, because perforation may exist anyway. Attention is called to the fact, in three or four well-considered opinions, that gas may not be present in the small bowel, though it usually is present in the large bowel and the stomach.

To conclude with my own present opinion of the method, I cannot help but say that I am personally very much impressed with its value in my own hands, and that I have thus far not been misled in any doubtful case by depending on it. As I said a moment ago, the two cases of perforated duodenal ulcer showing no gas were perfectly clear clinically. In case of doubt, it is necessary to have the film repeated at intervals of a few hours, preferably at the bedside; if then still in doubt, I should operate. This is a laboratory method, and, like all other laboratory methods, must be used with due discretion and reservation.

I wish to call attention to the fact that I am speaking here only of acute perforation,—not the subacute perforation that may occur, for instance, in gastric ulcer. Finally, perforations of the appendix do not permit the escape of gas. The method is of no value in appendicitis.

I should appreciate it very much if those choosing to use the method would advise me some time of their results, so that the true value of the procedure may be arrived at, by common consent.

Replies from hospitals using the method, in summary:

1. Men on service agree that it is an accurate and important diagnostic test; should be used as routine in suspected perforation.
2. No experience except in duodenal ulcer; fine in this condition.
3. Almost invariably present; no analysis of cases.
4. Have used it in questionable cases; of great value and accuracy.
5. Valuable assistance, especially gastric and duodenal ulcer; gas always looked for carefully, impression that it has turned out to be almost pathognomonic.
6. About 70% positive.
7. Valuable if there is time to use it, especially in duodenal perforation.
8. 100% if positive; absence of gas does not rule out perforation.
9. Seems to be accurate in about 75%; not used as routine.
10. Not routine, but frequently used; when positive, can be relied on; when negative, not infallible.
11. By no means constant in perforation; almost routinely used, and in the majority we are unable to demonstrate free air.
12. Helpful at times if present; if absent, without significance.
13. Not more than 60% accurate; not used as routine.

XUM

14. Very limited experience; in one or two cases has been of aid; feel that X-ray is not yet developed enough so that much reliance can be placed on it.
15. No one on the service ever requests this examination; vaguely recall its use in suspected perforation of ulcer—not in traumatic cases.
16. Impressed by the literature; but only traumatic perforations have been caused by gunshot wounds, and here the operative indications have been so plain that they have not been checked by the X-ray.
17. Perforation of small intestine not apt to show gas; perforation of colon and stomach more apt to show it; not more than 60% accurate.
18. Accurate in 50% of intestinal perforations, 80% of stomach perforations; of considerable corroborative value.
19. If positive, always means perforation; however, small bowel is usually implicated in injuries, and it usually contains no gas; therefore, don't wait for spontaneous pneumoperitoneum, but operate.
20. Used it principally in attacks pertaining to stomach and duodenum; one of the earliest signs in these abdominal catastrophies; acts as a positive finding in about 70%; useful procedure to differentiate from other calamities. We use X-ray as a check in all acute upper abdominal lesions in which we are at all doubtful about the diagnosis.

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712 *Botetourt Street.*

DISCUSSION

DR. G. PAUL LAROQUE, Richmond: Though we have known of this method of examination for a couple of years, we have not employed it as much as we should have done until recently, for the reason that the first case in which we employed the X-ray did not show the gas in a perforating ulcer of the duodenum. This proved at operation to be a "slow leak," partially closed by exudate and omentum, in which there was not enough air in the cavity to show on the X-ray. We have found in several instances since, when there is a "slow leak" instead of a "blow-out," the air may not show in the X-ray. Where there is a large leak or "blow-out," this can usually be recognized clinically. Our present impression is that where we feel there ought not to be an operation, or in a medical case, such as pneumonia or spider bite, or something like that, before we go to bed we had better have an X-ray made, for fear we might have gas.

We are doing now a great many more of them, and we find them not yet one hundred per cent correct. It may be necessary to improve our technique. If we improve that, we might get the small, slow leaks. We find at the table the small leaks are covered with omentum and are not leaking any longer. This is not true, of course, of larger perforations.

We have not felt it worth while to apply it in bullet wounds, because we think they are operable anyway, and I certainly would not have the courage to wait in a bullet wound. There are, however, some cases is which there is genuine doubt. We do see blunt-force injuries, mule kicks, automobile injuries, in which we would hate to operate unless there is perforation of a hollow viscus. Contusions of the liver and contusions of the spleen, unless there is tremendous injury, do not call for operation, but perforation of a hollow viscus does. In every case of blunt-force injury we have learned to depend upon the air under the diaphragm. Every case of rupture of the stomach or bowel which has occurred from blunt force has shown the air under the diaphragm. Therefore, we are depending upon negative findings there, whereas, in perforating ulcers we are depending upon positive findings.

I think this subject is very timely, and I believe we ought to use this method more than we have been doing.

DR. F. C. RINKER, Norfolk: There is just one point in Dr. Todd's paper which I would like to stress, and that is a condition which is not caused by traumatic puncture of the intestines. I have in mind typhoid perforation. Dr. Todd said there were certain changes in temperature and pulse and called the attention to the possibility of pain, but he did not state anything about the differentiation between hemorrhage and perforation in typhoid fever. Both of these conditions cause a decrease in temperature and rise in pulse rate. The differentiation between the two clinically is difficult, but with the aid of frequent blood examinations, it is not so difficult.

When such conditions are suspected, life may be saved by studying the differentiation of the polymorphonuclear cells in the blood smear, according to Schilling or the Roberts' modification of the Schilling count. I prefer the Roberts' modification because it can be done in the ordinary laboratory with little difficulty.

DR. MARSHALL J. PAYNE, Staunton: I have had experience with just two cases, both stab wounds of the abdomen. The question came up as to whether or not there was visceral perforation. These cases were submitted to X-ray examination, and the report was not perforation of the viscus. I followed out the suggestion, and both cases got well.

In another case a man was at a fair and admitted drinking some wine. He got sick and vomited what he said was blood. It was a rather delicate question to say whether or not he had perforation. I relied on the X-ray, and the results were all right.

DR. TODD, closing the discussion: I was particularly interested to know whether the hospitals in Virginia were using this test. I was in a hospital in Norfolk the other day and asked an intern there if they were using it, and he said, yes, they were using it all the time. I had hoped Dr. LaRoque would say they were using it regularly in Richmond.

I am indebted to Dr. Rinker for his mention of the use of the differential cell count. I am not familiar with that, but am informed it is of much value.

NEO-NATAL SHOCK AND ASPHYXIA.*

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The incidence of neo-natal shock and asphyxia and their frequent fatal termination should serve to focus our attention on these two conditions and stimulate a study of the causative factors, the prevention, and a satisfactory plan of treatment. Although rapid advances have been made in recent years in operative obstetrics, obstetric analgesia and anesthesia, prenatal care, etc., this important field has been sadly neglected. Indeed, methods now commonly employed against these complications have changed little since the days of Mauriceau, Chamberlen, Smellie, and Simpson.

In the birth registration area of the United States, including only 87.3 per cent of our population, the Bureau of the Census[1] reported for the year 1927, 82,931 still-births out of a total of 2,220,767 births, or nearly 4 per cent. The number of infants that succumbed shortly after birth increased the combined still-birth and neo-natal mortality to 8 per cent. Holt and Babbit found 4.4 per cent still-births in 9,747 viable infants at the Sloane Maternity in New York.[2]

From the standpoint of etiology these cases fall into three groups: shock and asphyxia due to an interference with the oxygen supply (suffocative asphyxia), compression of the brain (paralytic asphyxia), and circulatory failure.

The various conditions which give rise to interference with the oxygen supply to the fetus are so well known and so generally recognized as to make it superfluous to detail them here.

Compression of the brain due to prolonged labor, to a relative cephalo-pelvic disproportion, to a prolonged second stage with the head pounding against a rigid pelvic floor and perineum, or from inadvisedly attempted and unskilfully executed forceps operations, is a frequent cause of neo-natal shock. Injury or trauma of the cardiac and respiratory centers may act directly by paralyzing the vagus and slowing the heart, thereby diminishing the minute volume of blood flow to and from the placenta, and giving rise to a condition of anoxemia.

Circulatory failure as a causative factor in neo-natal shock and asphyxia to our mind has not been sufficiently appreciated nor emphasized. According to Leff,[3] the mechanism is as follows: During uterine contraction the placenta is compressed and a variable amount of blood is forced out of it into the fetus. This increased quantity of blood in the fetus raises the pressure of the fetal circulation and thereby causes a slowing of the fetal heart in accordance with "Marey's law" which states that the pulse rate varies inversely to the blood pressure. When the uterine contraction subsides, pressure on the placenta is relieved, excess blood flows back to the placenta, the tension in the fetal vascular system is relieved, and the fetal heart returns to normal rate. When the uterine contractions become very strong this process is exaggerated, and, when tetanic contraction occurs, the pressure on the placenta is uninterrupted and the heart does not return to its normal rate. More blood is forced into the fetal circulation, the heart becomes distended, over-loaded, and dilatation with fetal death results. Leff further states that this increased tension of the fetal circulation may cause rupture of the blood vessels, particularly those in the brain, which might in turn bring about a condition of paralytic asphyxia.

Intelligent and successful treatment of respiratory failure depends upon a sound understanding and application of the physiological principles involved. After birth the infant breathes in response to the same stimulus and by the same mechanism as do adults. The initiation, maintenance, and regulation of breathing depends upon the CO_2 brought to the respiratory center by the circulating blood. Oxygen is required to maintain the center itself in a normal condition because no cell, particularly a highly specialized one, can live long when deprived of oxygen, and rapidly degenerates beyond the point of stimulation. Also, the center may be quite normal but at the same time inactive in the presence of an adequate oxygen supply if the blood is deficient in carbon dioxide. Under these circumstances carbon dioxide is the one and only stimulus that will restore and maintain normal activity. Physiologists have discarded the theory that respiration is essentially due to afferent stimulation and have adopted the chemical theory of Haldane and his co-workers.[4]

In order to insure a minimum degree of shock

*Read before the Richmond Academy of Medicine, October 10, 1933.

and asphyxia, it is possible and proper to follow certain precautions and adopt certain prophylactic measures during the conduct of labor and immediately following birth.

Fig. 1.—The Flagg hand suction apparatus for aspiration of the nasopharynx and trachea. The pharyngeal and intra-tracheal attachments are shown.

Certain analgesics and anesthetics employed during labor have a depressing effect upon the infant. Morphine is most notorious among these and should not be used within three hours before labor is expected to be terminated. It is important to bear this in mind in preparing a patient for caesarean section. The various derivatives of barbituric acid which are becoming so popular as analgesic and hypnotic agents seem to have little or no depressing effect upon the the vital functions of the infant. Nitrous oxide and oxygen mixture, unless contraindicated, is the ideal anesthetic when deep anesthesia is employed.

Frequent auscultation of the fetal heart furnishes a reliable index to the condition of the fetus. Except in breech presentation the passage of meconium is a late sign of fetal distress. Prompt measures should be instituted to rescue the endangered child rather than wait too late, as is often the case. In many cases of prolonged or hard labor we can anticipate fetal shock before any signs appear and terminate labor while the infant is still in good condition. It is our firm conviction that low and outlet forceps can be employed to shorten the second stage, with a great deal less shock and trauma to the infant than allowing the head to be pounded against an unyielding pelvic floor and perineum over any extended length of time. A critical survey of the observations made by Murphy and Thorpe[5] in their study of respiration in the new-born fails to indicate any pronounced difference in the respiratory rate, minute volume, and mean tidal air in infants insofar as the method of delivery is concerned, whether birth was spontaneous or facilitated by axis-traction forceps. This does not mean to imply that a difficult instrumental delivery does not often bring about a condition of shock and asphyxia but a possible explanation for these findings is that some of the infants born spontaneously and in poor condition should have been delivered earlier by some operative procedure. In the occiput posterior position of the vertex, or in the presence of errors in flexion and asynclitism, termination of labor by forceps or podalic version and extraction is often safer for the child than a prolonged second stage. In breech presentation, decomposition and extraction as soon as the cervix is completely dilated minimize the danger of asphyxia from compression of the cord which is so frequently seen in the prolonged second stage of these cases. The Piper forceps for the delivery of the after-coming head has done a great deal to diminish the trauma and shock attending breech extraction.[6]

The pathologic physiology involved in asphyxia, although intricate in its relations, follows a definite sequence of events which under logical treatment is comparatively simple. It must be remembered that we are dealing primarily with a condition of shock as well as respiratory failure. Immediately upon delivery the child should be grasped by the feet and suspended head down. The chest is then gently compressed between the thumb and forefingers of the other hand as recommended by Prochownick, in order to squeeze out any mucous or foreign matter in the bronchi. The neck is then gently stroked toward the mouth to free the upper air passages. Any mucus or foreign material remaining in the oral or nasal cavities should be carefully aspirated. If we are dealing with an aftercoming head, the air passages should be cleared as soon as the mouth and nostrils appear at the vulva. The infant should now be carefully but quickly examined to determine the degree of shock or asphyxia present. The con-

dition of the heart-beat, color, muscle tonus, and reaction of the pharyngeal and "sucking" reflexes will give this information. If the mother is anesthetized, CO_2 should be administered to her before the cord is tied in order to stimulate the fetal respiratory center. As a prophylactic measure against atelectasis, secondary respiratory failure, and pneumonic conditions, it is of utmost importance to clear

Fig. 2.—Simple type of apparatus recommended by Henderson for administering various mixtures of O_2-CO_2.

the air passages before the infant gasps, if possible; and under no circumstances should artificial respiration be instituted before this has been done. The importance of keeping the infant warm is not generally appreciated. The skin is damp, evaporation is rapid, causing a fall of body temperature, further depression, and increasing the degree of shock. Further treatment depends upon the degree of shock and asphyxia we are dealing with. Mild cases respond to simple methods; severe cases require heroic measures.

One of the most simple and time-honored maneuvers is mouth-to-mouth insufflation. Probably the earliest reference to its use that appears in the literature is found in II Kings, chapter 4[4]:

"And when Elisha was come into the house, behold, the child was dead and laid upon his bed.

He went in therefore, and shut the door upon them twain and prayed unto the Lord.

And he went up, and lay upon the child, and put his mouth upon his mouth and his eyes upon his eyes, and his hands upon his hands: and he stretched himself upon the child; and the flesh of the child waxed warm.

Then he returned, and walked in the house to and fro; and went up, and stretched himself upon him: and the child sneezed seven times, and the child opened his eyes."

Elisha's method was scientific. He applied heat; he did not man-handle the child; and he inflated the lungs with a fair amount of CO_2 (3 to 5 per cent). In employing mouth-to-mouth insufflation, only the gentlest force should be used as there is considerable danger of rupturing the delicate pulmonary alveoli. De Lee[2] recommends inflation through a tracheal catheter. In spite of the apparent ease with which De Lee employs the catheter, it is a difficult and dangerous procedure in the hands of most of us. Complications that arise from its use are the production of a false passage with emphysema and pneumothorax and rupture of the alveoli. There is no way of accurately controlling the pressure, and it has been proven that it is possible to blow air through the pulmonary system into the heart and general circulation.

In administering CO_2 a 6 to 10 per cent O_2-CO_2 mixture is recommended. Henderson has recommended a simple apparatus,[4] consisting of a cylinder containing the O_2-CO_2 mixture to which is attached a reducing valve for accurate adjustment of the gas mixture which flows through a vertical water filled tube in such a way that gas escapes when a maximum pressure of three inches of water is reached. The gas flows through a tube leading to the mask which is so calibrated that the flow of gas cannot exceed one liter per minute. A small infant-size closed mask, with or without a bag reservoir attached, is used. The lungs are expanded by gently compressing the bag, or by closing the escape tube leading from the mask. This method is applicable and gives satisfactory results in mild cases of asphyxia provided that the air passages are not obstructed. The apparatus is also very useful in dealing with secondary respiratory failure.

XUM

In severe cases of respiratory failure and shock we cannot afford to waste valuable time by using inadequate and inadvisable procedures. In these cases the air passages are almost always blocked down to and including the bronchi. If the obstruction is not quickly removed and O_2 and CO_2 delivered to the alveoli capillaries, the respiratory center will be depressed by the anoxemia beyond the point of come-back. The high right heart pressure, low left heart pressure and reduced cerebral circulation attending atelectasis will not be corrected until the alveoli have expanded and allowed the pulmonary circulation to function. Aspiration of the mouth, pharynx, and nasal passages is insufficient in these cases. Direct laryngoscopy and bronchoscopy is necessary.

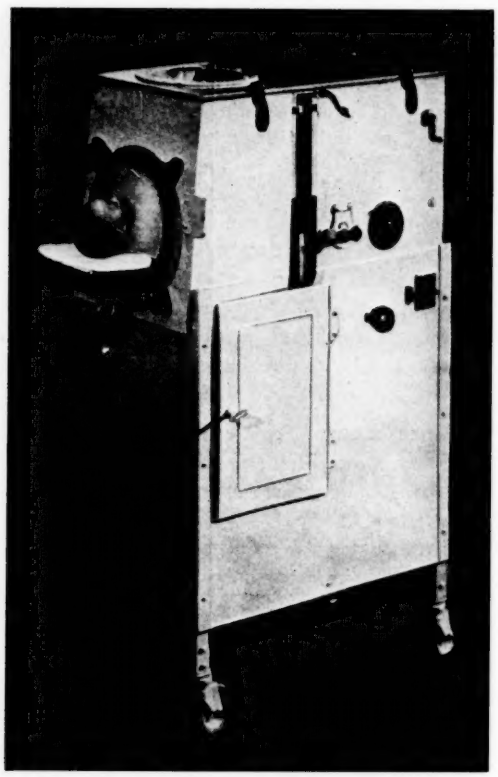

Fig. 3.—The Infant Model Drinker Respirator.

Flagg[9-10-11] has designed an apparatus and described a technic which in our hands has proven eminently satisfactory. Indeed, we believe it is the only method by which many infants can be saved. The equipment consists of the following: (1) A hand suction outfit with pharyngeal and intratracheal attachments which develops a negative pressure of from 40 to 60 mm. of Hg. (2) A tank of O_2-CO_2 mixture with a reducing valve and pressure gauge attachment. (3) A specially constructed water manometer twenty-two inches high which affords a means of limiting the pressure at any point up to 44 mm. of Hg. Aspiration from the manometer is prevented by a safety valve. (4) Pharyngeal and intratracheal insufflation tubes through which the gas flow is regulated by an opening controlled by the thumb. (5) A laryngoscope consisting of a detachable speculum with bulb and a handle containing the battery.

Flagg's technic is simple and effective. The infant is placed on its back. The head is extended by having it project slightly over the edge of the table. The mouth is held open with the thumb and forefinger of the right hand. The illuminated speculum is passed over the tongue which is pressed against the floor of the mouth until the epiglottis is exposed. The hypopharynx is now in full view and any secretion can be aspirated under direct vision. The lip of the laryngoscope is now passed just beneath the epiglottis. If the reflexes are sluggish, the intratracheal suction tube is passed into the trachea which is then aspirated of all fluid and mucus. Assured now that the air passages are cleared and that the danger of forcing foreign material into the smaller radicals of the bronchial tree is minimized, we proceed with the administration of the O_2-CO_2 mixture. The intratracheal tube is connected directly with the manometer in which the water level has been set at the desired height. Under direct vision, with the aid of the laryngoscope, the intratracheal tube is inserted. The flow of gas into the trachea is controlled by alternately opening and closing the escape valve on the intratracheal tube with the thumb at the rate of thirty to forty times per minute so as to simulate normal respiration as closely as possible. When the pharyngeal reflexes have become active or have not been depressed in the first place, the pharyngeal tube is used. The O_2-CO_2 mixture is administered until normal respiration is initiated.

Drinker[12] has designed an infant model of his well-known respirator for treating conditions associated with respiratory failure, and, along with Murphy and others,[13-14-15-16-17] has advocated its use in conditions of asphyxia and shock in the new-born.

This apparatus consists of a metal chamber of ample proportion to accommodate an eighteen pound infant. In the head end of the chamber is an eight-inch opening over which is placed an adjustable, snuggly fitting rubber collar through which the head protrudes. The cover of the respiration chamber is hinged and, when closed, is air tight. Tubular electric lamps installed within the chamber provide adequate illumination and maintain the temperature at approximately 95 degrees F. By means of an electrically driven air pump and valve arrangement, changes of air pressure are induced within the respirator. This is recorded by means of a

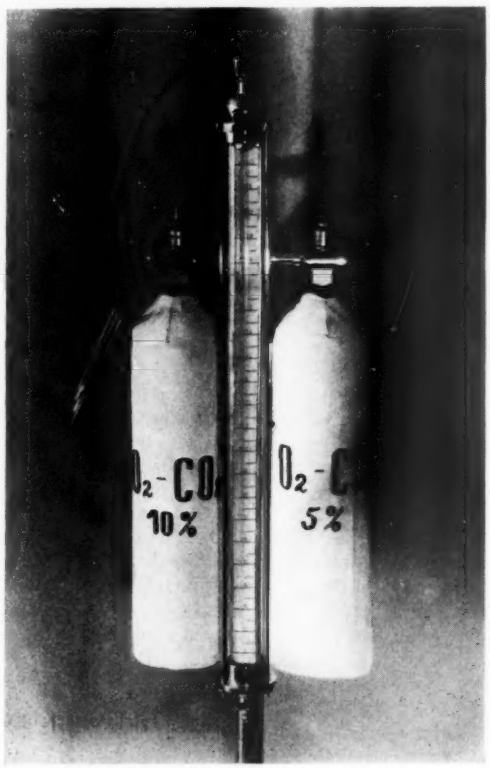

Fig. 4.—The Flagg apparatus: showing the special manometer and laryngoscope. Accessories are shown in Fig. 1.

water manometer which registers the pressure being applied at each respiration. Any respiratory rate desired from thirty to sixty-five per minute and any depth of respiration from 0 to 25 cm. can be obtained by adjusting a control dial. Moderate degrees of accurately measured negative pressure are made to alternate rhythmically with atmospheric pressure. When negative pressure is applied, air enters the respirator through the nose, mouth, and trachea; it is drawn into the lungs, and the chest expands. When the negative pressure within the respirator returns to normal, the elastic recoil of the chest produces expiration.

Two important provisions for the treatment of asphyxia are lacking in this apparatus—a satisfactory method of clearing the air passages, and provisions for administering CO_2. Murphy *et al* clear the naso-pharynx by means of suction through a soft rubber catheter, but direct laryngoscopy with a means of clearing the trachea is unquestionably the method of choice. An infant whose respiratory center is deeply depressed will often fail to respond to insufflation with air but requires CO_2 as a stimulus. This can be administered very effectively by means of the apparatus recommended by Henderson[4] while the infant is in the respirator. Indeed, these two machines used in conjunction, furnish a very satisfactory method for managing these cases. We are not quite as enthusiastic as Murphy in the use of the Drinker apparatus in treating cases of primary asphyxia and shock, but have found that it is more useful in the treatment of secondary respiratory failure, particularly in premature infants. The respirator makes an excellent incubator and a satisfactory degree of pulmonary ventilation can be maintained for hours or for days, if necessary.

Following resuscitation, the asphyxiated infant should be watched closely for the first twenty-four or forty-eight hours, as secondary respiratory failure not infrequently occurs. Henderson[7] states that even the normal infant should have a ten-minute inhalation of O_2-CO_2 three times daily during the first three days of life as a prophylactic measure against atelectasis and pneumonia. This hardly seems necessary under normal circumstances, since the new-born infant ordinarily cries sufficiently to keep the lungs expanded. However, this procedure should certainly be carried out in cases of either primary or secondary respiratory failure in premature infants.

Certain ancient procedures designed to revive the new-born are still widely practiced. Most of these are to be condemned in the light of our present knowledge of the physiology of shock and asphyxia. If we were called upon to treat an adult suffering with shock as a result of some traumatic accident, or asphyxiated or suffocated from any cause, we

would not think of exposing the naked body to the cold, swinging the body by the arms in circles over our heads, bending the body until the head and feet were made to meet, vigorously beating it with our open hand, and finally plunging it alternately into hot and cold water. Instead, we would proceed in accordance with the well-known principles of the management of shock, supplying warmth and inducing rest. A new-born infant, even under the most favorable conditions, is subject to a great deal of trauma during labor, and almost always is suffering from some degree of shock, depending upon the difficulties of the passage through the birth canal. To be beat, swung, and exposed in such a condition not only decreases the chances for survival but often inflicts additional injury, as autopsies on still-born infants so treated have revealed fractured ribs and ruptured viscera. New-born, so treated, often survive in spite of, not as a result of, this type of treatment.

SUMMARY

Neo-natal shock and asphyxia are frequent obstetric complications, being a large determining factor in the neo-natal mortality rate of nearly 8 per cent for the entire country.

The physiology of this condition and the mechanism it follows is discussed.

Certain older methods of resuscitation involving severe man-handling of the infant are condemned, not only as being useless, but as being distinctly harmful.

Certain prophylactic measures are suggested, and several methods of dealing with varying degrees of asphyxia and shock are outlined and compared. The important principles to be observed are—maintenance of body heat, clearing the air passages, and administering carbon dioxide and oxygen.

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PRIAPISM.*

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Priapism as defined by Keyes is a condition of prolonged erection independent of the will or emotion of the patient. It is a symptom rather than a disease and usually indicates and accompanies a condition of grave importance. The priapism may be transitory or of prolonged duration, in which latter event there is loss of sexual desire and pain follows after twenty-four to forty-eight hours. The condition may be encountered by anyone practicing medicine no matter what field he is interested in, especially by the physician in general practice, and as persistent pain is always present it is important to know what can be done to relieve the sufferer. Fortunately there is a simple procedure which can be carried out easily in the home or office, bringing rapid and usually permanent relief to the patient and which will be described more fully in discussion of the treatment.

Many cases of priapism of prolonged duration have been reported, with a long list of causes, some of which are rather bizarre in nature. The most common basic cause from an anatomical standpoint is thrombosis of the return venous circulation of the penis and deep pelvic veins, while this in turn is the result of several predisposing factors.

Cases have been reported as due to local irritation, such as phimosis, urethritis, fissure in ano; or to more remote sources as nasal polypi. It has been known to accompany general systemic disease, such as diabetes mellitus, typhoid fever, leukemia and cancer. Excessive doses of aphrodisiac drugs, such as tincture of cantharides and yohimbin, have led to prolonged priapism. Following sexual excess there is sometimes an engorgement and thrombosis of the corpora cavernosa resulting in painful priapism. Fractures of the spine, myelitis, tumors of the spinal cord, syphilis of the central nervous system, fractures of the skull with cortical irritation sometimes are the etiologic factors in priapism.

Scheidegger in 1932 reported two cases coming to autopsy with priapism remaining after death, in which cancer of the rectum with extensive venous thrombosis was found to be the cause in one and intoxication by excessive doses of yohimbin causing it in the other. The latter case was one of the few reported in which the engorgement predominated in the corpus spongiosum, as this is almost invariably found predominant in the corpora cavernosa. Hughes in 1932 reported a case following excess in drinking and sexual relations, which was relieved spontaneously in twenty-three days, and a second case in a young man shot through the lower abdomen who had a priapism of twelve days' duration in whom autopsy revealed an extensive cellulitis and thrombosis of the pelvic veins. Craver, in the Surgical Clinics of North America in 1933, discusses priapism as a complication of leukemia. He says that, although it is a rare complication of both types of leukemia, nevertheless, of the published cases due to all causes, 33 per cent to 40 per cent of them accompanied leukemia. He does not think pressure from enlargement of the spleen or glands is the sole cause, although some cases have improved following suspension of the spleen by addominal binder. He reports a case, the only one seen at Memorial Hospital, New York City, since 1918, in a series of 100 male patients with leukemia. Although aspiration of blood from the corpora cavernosa was tried, he attributes subsidence of the priapism to treatment of the spleen by X-ray. Impotence followed disappearance of the priapism which, according to the literature, is the usual sequel.

In treating priapism it is of utmost importance to recognize the fact that it may be a result of serious disease, and, consequently, a thorough diagnostic study should be made. It is all right to direct one's attention to the immediate relief of the patient, but this must by no means overshadow the importance of making a correct diagnosis. Often the priapism is the presenting symptom with no particular evidence of the underlying pathology apparent, as was the case in the two patients to be reported in this paper. Treatment, therefore, should be directed, first, to the disease causing the priapism, and then to subsidence of the erection. The usual drugs, such as bromides, luminal and other sedatives, are used with some slight benefit, mostly to

*Read before the Seaboard Medical Association of Virginia and North Carolina, at Norfolk, December 5-7, 1933.

calm the patient. Morphine and codeine may be used for pain. Spinal anesthesia, ether and chloroform will not reduce the priapism. As a matter of fact, spinal anesthesia sometimes causes a semiflaccid erection. Huhner reports the successful treatment of six cases by epidural anesthesia, but these were not of the severe type requiring operation. The most successful treatment from the standpoint of immediate subsidence and relief of the patient, is incision into the corpora cavernosa on both sides under local or general anesthesia with expression through the enlarged openings of old dark blood and blood clots. The incisions are best made with a sharp bistoury plunged into the shaft near the junction of the penis with the body—well to each side to avoid striking the large dorsal artery and vein. The incisions may go deeply in, but care must be taken not to go through to the corpus spongiosum for fear of incising the urethra. The length of the incisions may vary from one to two centimeters. After the incision is made a rather profuse flow of a mixture of bright red and old dark blood will occur, but if a blunt Kelly clamp is carefully introduced and opened, several good sized blood clots can be extravasated with the aid of slight pressure. Danger of excessive bleeding is not great except in the cases of leukemia where packing and even suturing may be necessary. Instead of the above procedure, aspiration with a syringe and needle may be used but complete evacuation, especially of large blood clots, cannot be as successfully accomplished as with incision. Patel reported a case of priapism developing three days following the onset of acute articular rheumatism, in which spinal, epidural and ether anesthesia produced no beneficial effect. Twenty-one days after onset he made incisions, evacuating large blood clots with almost immediate and permanent relief. Chalier, in discussing Patel's paper, referred to a case he reported in 1914 of two weeks' duration following post-typhoid phlebitis, which he successfully treated with incision and which he thought was the first case so treated. Section of the pudic nerve has been advocated and used with success, but it must be remembered that this precludes the possibility of future erections and that there is usually some incontinence and dribbling of urine afterwards.

During the past three years two cases have come under observation which are here reported.

REPORT OF CASES

Case 1.—B. K.; age 4 years, white, male, admitted to the Elizabeth Buxton Hospital June 19, 1930. His mother stated that for one month he had become progressively weaker and that beginning with this weakness she had noticed some enlargement of glands in his neck and groin. Two days before admission to the hospital he had an erection upon awakening, and on admission this had become quite painful. His past history was essentially negative.

Physical Examination: Reveals an anemic white male child, lying in bed apparently quite uncomfortable. Temperature 100°; pulse 110; respiration 24.

Head: Negative. Neck: There are several enlarged glands of the neck. Teeth good. Tonsils hypertrophied. Chest: Lungs: Apparently normal. Heart: Rate increased. Apical systolic murmur. Abdomen: Soft, flat. No masses, distention or tenderness. Spleen palpable.

Genitalia: There is general edema of the entire penis. Small amount of sloughing. Penis is erect and stays so. Some edema of scrotum.

Glands: General glandular enlargement.

Extremities: Negative.

Laboratory: Urinalysis shows faint trace of albumin, few erythrocytes, few pus cells and casts. R. B. C. 2,680,000; W. B. C. 473,000; Hb. 40 per cent; P. M. N. 3 per cent; small lymphocytes, 96 per cent; large lymphocytes, 1 per cent; normoblasts present. Blood Wassermann: Negative.

Operation: Under ethylene anesthesia, after cleansing the skin with alcohol, ether and mercurochrome, two lateral incisions, 1 cm. long, were made over the corpora cavernosa at the base of the penis. Several drams of old, dark blood were evacuated, after which the blood became natural in color and the bleeding was quite profuse. It was necessary to take three deep sutures on either side to control the bleeding. This procedure relieved the priapism immediately.

Subsequent Course: The erection returned partially but never as marked as before operation and the pain was relieved. Under X-ray therapy his spleen and glands subsided and his W. B. C. went as low as 61,000. He left the hospital fourteen days after admission improved as to his leukemia and with no evidence of priapism. He returned in one week, and, although his W. B. C. had increased

markedly, he had no priapism. He received further X-ray treatment, but except for a few remissions the W. B. C. increased, the highest being 925,000. He was discharged in twelve days and died at home some weeks later. He had no return of the priapism.

Case 2. L. E. D., colored, male, age 23 years, meat packer, admitted to the Elizabeth Buxton Hospital September 17, 1933.

Present History: Patient states that he awakened eight days ago with an erection of the penis. This condition has existed continuously since that time, though he has been seen and treated at intervals during the past week with hot applications to the perineum as well as internal medication. He states that the night before onset of trouble he had intercourse. He also states that in the past he has had an erection which existed for several hours at the time. Since the erection began patient has been able to void normally and complains of no pain from the penis except when he moves. He gives no history of urethral discharge or urinary symptoms.

Past History: Patient states he received "shots" for blood disease some years ago.

Physical Examination: Well-developed negro, age 23 years, lying quietly in bed.

Temperature 101°; pulse 110; respiration 20.

Head normal in contour. Pupils react to light normally but very sluggishly to accommodation. Thorax: Not abnormal. Blood pressure: systolic 150, diastolic 90. Abdomen: Apparently normal. Genitalia: There is marked erection of the penis, with moderate tenderness upon motion. Reflexes: Knee jerks hypo-active.

Laboratory: Urinalysis shows 3 plus pus. R. B. C. 4,630,000; W. B. C. 6,650; P. M. N. 68 per cent; small lymphocytes, 28 per cent; large lymphocytes, 4 per cent. Blood Wassermann, 4 plus; spinal fluid Wassermann, negative. Spinal fluid cell count: 38 small lymphocytes per cu. mm.; globulin: trace. Smear: No tubercle bacilli seen. Stool: negative.

Treatment: On night of admission spinal anesthesia with 50 mgms. of procaine hydrochloride was given, which had no effect upon the priapism. While under this anesthetic an incision about 2 cms. long was made in each corpora cavernosa and several old blood clots and dark blood were extravasated. The priapism immediately subsided to a semi-flaccid state, but the erection returned in about forty-eight hours. In view of the spinal fluid cell count, luetic meningitis was suspected and two spinal punctures with withdrawal of spinal fluid to relieve pressure were done at two-day intervals. As the erection persisted, a second spinal anesthetic was given and openings were made at the site of the previous incisions and again several old, dark, blood clots were removed. As there was not excessive bleeding, two very small rubber tubes were placed in each incision to keep them from closing too early and to continue drainage of old blood. Anti-luetic treatment had been started in the form of neo-salvarsan, and three days after the second operation the patient left the hospital with only a very slight congestion of the penis. He returned in about two weeks, and, except for a low grade infection in the wounds, he was perfectly well. He was last seen two months after discharge from the hospital and was apparently quite well, having returned to work. He has had no erections since. His anti-luetic treatment is being continued.

CONCLUSIONS

Two cases are reported in which priapism was the symptom bringing the patients to the hospital for treatment. One complicated a case of lymphatic leukemia, and the other was the result of syphilis of the central nervous system.

The importance of attempting to make a proper diagnosis is emphasized, as the priapism is usually a symptom of serious disease. Incisions into the corpora cavernosa give immediate and usually permanent relief and are recognized as the most satisfactory type of treatment. This may be done under local, general or spinal anesthesia.

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Buxton Clinic.

BIRTH CONTROL, A SOCIAL AND ECONOMIC NEED.*

R. W. GARNETT, M. D.,
Health Officer,
Danville, Va.

The increasing frequency with which topics of this general nature are being presented in medical meetings, in meetings of other scientific groups, in the resolutions passed by various church assemblies, as well as in popular articles, indicates a growing realization of the seriousness of the population problems which face us in America.

In the early stages of the human family, infanticide was widely practiced and was thought to be the right and proper means of limiting the size of the family. Even in relatively recent times certain peoples disposed of unwanted infants, especially when food was scarce.

When, with growing enlightenment, infanticide was finally tabooed, abortion came into vogue and, as is only too well known, is very extensively practiced today. It is stated by students of the subject that there are over a million abortions induced annually in the United States. When one contemplates the significance of this state of affairs and the large number of women whose lives are lost on account of it, the thought is appalling.

That so many women should take such risks in order to terminate pregnancies which, for one reason or another, they deem undesirable, places a serious responsibility upon society and upon the medical profession in particular.

Let us consider a few fundamental biological facts and some of the ways civilized man has upset nature's population balance. Within the last century the death rate has shown a more rapid trend downward than ever before—a trend out of all proportion to the down trend of the birth rate. When immigration ceases to be a major factor in population increase, as is now the case in the United States, and the death rate, due principally to the triumphs of preventive medicine, has reached an almost undreamed of low mark, then there must be a normal decrease also in the birth rate to avoid over-population and its attendant economic problems.

In pre-vaccination days in the old world smallpox carried off hundreds of thousands annually. During the fourteenth century the "black death" or bubonic plague is estimated to have killed one-fourth of the population of Europe. The tuberculosis death rate in the United States has been reduced by half in the past half century. The infantile diarrheas have been largely controlled through a safer milk supply and better feeding methods for babies. Diphtheria has been largely robbed of its terrors; typhoid, malaria and yellow fever are under control. The average length of life in the United States is now 58—an increase of about sixteen years within this century. These are some of the factors profoundly influencing our population trends.

Among certain classes of our people, small families are now the rule, with one, two, and rarely as many as four children. This shows that those elements of society which should be furnishing the intellectual, moral and political leaders of tomorrow are being outnumbered by those who, from the standpoint of heredity, may be biologically incapable of furnishing such leadership.

Voluntary birth control or limitation of family size is already fast coming to be the accepted and approved practice in certain elements of society, but unfortunately not with those elements where it is really needed most. A comparative study of the size of the families of doctors, lawyers, college professors, statesmen, as against those of certain economically submarginal members of society is disconcerting to the student of sociology. The following quotation from a publication of the Human Betterment Society of California is to the point: "Strong, intelligent, useful families are becoming smaller and smaller." Irresponsible, diseased, defective parents, on the other hand, do not limit their families correspondingly. There can be but one result. That result is race degeneration.

"The law of self-preservation is as necessary for a nation as for an individual."

"When families that send a child to an institution for the feeble-minded average twice as large as families that send a child to the university, it is time for society to act."

*Read before the South Piedmont Medical Society, at Danville, Va., November 28, 1933.

WHAT CAN BE DONE?

As has already been stated, voluntary birth control is being practiced extensively among certain classes of our American people. Unfortunately this is true mainly of those families which from an eugenic view-point are already too small, whereas voluntary limitation of the size of the family at the other end of the intellectual and economic scale is not being practiced.

There is ont outstanding, practical, humane and scientifically sound procedure which, if properly administered, will go far toward changing this alarming trend toward racial deterioration. This procedure is so called "eugenic sterilization for those types manifestly unfit for parenthood."

Twenty-seven states now have laws authorizing, under adequate safe-guards, this procedure for persons legally committed as feeble-minded or insane. Virginia's eugenic sterilization law was passed in 1924 and its constitutionality has been upheld in the United States Supreme Court. Up to 1933, however, only 479 men and 854 women, a total of 1,333 cases, had been sterilized.

California, the leader in this field, has performed this operation on 8,504 persons legally adjudged unfit for parenthood.

Quoting from "Sterlization for Human Betterment," by Gosney-Popenoe, we find:

"Experience everywhere demonstrates that the successful application of eugenic sterilization depends largely on an educated public opinion and the conservative administration of sound laws.

"The need for conservative, sympathetic, and discriminating use of such a measure in selected cases has been widely recognized as imperative since research began to bring forward more exact facts about the problem which confronts the American people.

"Careful studies indicate that there are 6,000,000 in the United States who have been, are now, or at some time will be legally committed as insane to state institutions. The number who suffer equal mental disease sufficient at some time to incapacitate them for work but who are never legally declared insane is about as great, making 10 per cent of the population, or 12,000,000 persons subject to mental disease in one of its most serious forms. Altogether apart from the undesirability of perpetuating such forms of mental disease, it needs no argument to maintain that many of this vast number should not have children either for the welfare of those children or for their own welfare, not to mention posterity.

"But these 12,000,000 mentally diseased persons are not the whole story. There are 6,000,000 additional who, though not mentally diseased, are so deficient in intellect, with an endowment in this respect that is more than 30 per cent below the average that they are often described as feeble-minded.

"Such handicapped persons are subject to exploitation, likely to get into difficulties with law enforcement officers, and certain to contribute more than their quota to the ranks of delinquency and crime, and much more to those of dependency and pauperism.

"Many of these defectives will never produce children, from natural reasons. It goes without saying that protection of the individual and of the race by sterilization would apply only to those defectives who are likely otherwise to produce children which they could not care for and who would be incapable of becoming self-sustaining, good citizens. In any humanitarian program for the latter group, that will enable them to find their proper place in the community and keep out of trouble, sterilization will often prove to be indispensable, because practicable, harmless, and certain in its results."

AMERICA'S BURDEN

"This, then, is the situation which America faces now: 18,000,000 persons who are or at some time during life will be burdened by mental disease or mental defect, and in one way or another a charge and tax upon the rest of the population.

"It challenges every thoughtful person.

"The misery resulting from insanity and feeblemindedness provides the first reason for grappling with the problem. No stratum of society is immune from such suffering.

"The economic burden is tremendous and steadily growing worse. A billion dollars a year would be a low estimate of the cost of caring for these unfortunates, either in or out of institutions. The cost to the community of those who are not cared for—who are furnishing a large part of the staggering crime bill and the losses due to accidents—is much greater.

"It is estimated that about one-seventh of the total revenue of our own state goes for the care of the insane, epileptic, feeble-minded and for the inmates of jails and almshouses.

"Finally, what sort of a government can be ex-

pected—what progress can be looked for—when so large a part of the voters are mentally abnormal?"

Briefly summarizing then the practical aspects of this problem, we see:

1. An existing trend toward over-population.

2. An already marked and disproportionate decrease in the birth rate, deliberately planned, among those elements of our population from which we must expect to develop the leaders of the future.

3. An increase in those elements of our population from which are most likely to come our criminals, paupers and never-do-wells, epileptic and insane of the future.

4. Manifestly these latter groups will not practice contraception measures on account of ignorance, religious prejudice, indifference, or an attitude of fatalism.

5. Organized society in America then *must* protect itself by means of eugenic sterilization applied in the most humane method possible if it is to be saved from the unhappy results of biologic degeneration.

6. It is a scientifically sound procedure, safeguarded by law, approved by common sense, a *protection* and *not* a punishment.

The second phase of this subject deals with the question which frequently physicians must face as to whether to furnish contraceptive information to physically and mentally normal people. As you probably know, the present Federal Law prohibiting physicians from giving contraceptive information is based on the idea that information about sex matters is obscene (the so-called Comstock laws). Repeated efforts to have this antiquated law repealed have failed. House Bill 5978 and Senate Bill S-1842 now pending before Congress propose changes in this law whereby physicians will be empowered by law to use their own judgment where, for social and economic reasons, it is manifest that the number of children in a given family should be limited by contraceptive measures. All of us have frequently observed the tragedy of the mother over-worked, frequently under-nourished, with seven, eight, perhaps ten children, facing the prospect of another pregnancy which she feels physically and morally unable to face with hope.

It is known to be a fact that in countries where planned limitation of the size of families has come into vogue, the effect has been strikingly beneficial in—

First, reduction of the maternal death rate.

Second, reduction of the infant death rate.

Third, reduction in the number of induced abortions.

Fourth, betterment in the economic status of many families on account of limitation of the number of children.

Whether or not doctors are still alarmed by any real or fancied threat of socialized medicine, here is a field at least in which physicians should have their thinking socialized and in which they should be real leaders for the good of society and in the interest of the coming generation.

DEATHS FROM DIPHTHERIA DIRECTLY PROPORTIONAL TO PERCENTAGE OF IMMUNIZATION.

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At the end of each school year the Division Superintendents of Schools report to the State Department of Education the number of children immunized against diphtheria. These reports for 1933 indicate that 41 per cent of the rural school children in the State had been protected against this disease.

The accompanying table shows in the first column the per cent of school children immunized, in the second column the number of deaths from diphtheria for 1933, while in the third column are starred the counties or cities exceeding the average diphtheria death rate for the State. The final report may show a few changes in the deaths.

Of the 148 deaths from diphtheria in rural Virginia last year, 112 occurred in twenty-six counties, all of which counties had less than 50 per cent of their school children immunized.

Dividing the counties into three groups according to the percentage of school children immunized

COUNTIES	Per cent school children immunized, 1933	Number deaths from diphtheria reported, 1933	Diphtheria death rates * above State average 0 below State average
Accomac	42	0	0
Albemarle	30	1	0
Alleghany			
Amelia	61	1	*
Amherst	4	1	0
Appomattox	51	0	0
Arlington	57	1	0
Augusta	45	2	0
Bath	51	0	0
Bedford	51	0	0
Bland	50	0	0
Botetourt	17	0	0
Brunswick	46	0	0
Buchanan	37	6	*
Buckingham	58	0	0
Campbell	40	3	*
Caroline	19	0	0
Carroll	68	1	0
Charles City	62	0	0
Charlotte	56	1	0
Chesterfield	100	1	0
Clarke	67	0	0
Craig	71	0	0
Culpeper	28	4	*
Cumberland	90	0	0
Dickenson	58	3	*
Dinwiddie	34	3	*
Elizabeth City	41	0	0
Essex	41	0	0
Fairfax	91	2	0
Fauquier	14	2	*
Floyd	13	0	0
Fluvanna	98	0	0
Franklin	7	2	0
Frederick	18	4	*
Giles	14	3	*
Gloucester	48	0	0
Goochland	56	1	0
Grayson	11	3	*
Greene	51	1	*
Greensville	81	0	0
Halifax	39	3	0
Hanover	11	1	0
Henrico	74	1	0
Henry	30	5	*
Highland	12	0	0
Isle of Wight	75	1	0
James City	63	0	0
King and Queen	30	0	0
King George	75	1	*
King William	38	0	0
Lancaster	37	0	0
Lee	48	3	*
Loudoun	52	1	0
Louisa	66	1	0
Lunenburg	28	0	0
Madison	65	0	0
Mathews	4	0	0
Mecklenburg	45	0	0
Middlesex	26	0	0
Montgomery	64	1	0
Nansemond	87	1	0
Nelson			
New Kent	40	0	0

COUNTIES	Per cent school children immunized, 1933	Number deaths from diphtheria reported, 1933	Diphtheria death rates * above State average 0 below State average
Norfolk	49	1	0
Nottoway	48	0	0
Northampton	69	0	0
Northumberland	46	2	*
Orange	71	0	0
Page	18	4	*
Patrick	12	3	*
Pittsylvania	23	5	0
Powhatan	52	1	*
Prince Edward	48	3	*
Prince George	31	0	0
Princess Anne	32	2	*
Prince William	39	2	*
Pulaski	39	3	*
Rappahannock	63	1	*
Richmond	62	1	*
Roanoke	26	4	*
Rockbridge	53	4	*
Rockingham	29	4	*
Russell	45	8	*
Scott	13	4	*
Shenandoah	21	0	0
Smyth	31	7	*
Southampton	66	1	0
Spotsylvania	79	0	0
Stafford	54	0	0
Surry	61	1	0
Sussex	22	2	*
Tazewell	12	6	*
Warren	42	0	0
Warwick	52	0	0
Washington	20	10	*
Westmoreland	46	0	0
Wise	36	4	0
Wythe	15	3	*
York	18	0	0
CITIES			
Alexandria	40	1	0
Charlottesville	11	0	0
Danville	32	4	*
Hopewell	88	0	0
Lynchburg	45	3	0
Newport News	33	0	0
Norfolk	42	3	0
Petersburg	.....	.....	.....
Portsmouth	10	2	0
Richmond	.....	.....	.....
Roanoke	28	6	*
Staunton	43	0	0
Suffolk	70	1	*
Winchester	6	4	*

against diphtheria, we find that in the first group having 75 percentage immunization, there were twenty deaths from this disease. The second group has 43 percentage immunization with forty-nine deaths, while in the third group there was only 19 percentage immunization with seventy-nine deaths.

Thus it is clear that the number of deaths in a community correspond closely to the per cent of school children immunized.

A few counties and cities are omitted in the table because the statistics were incomplete.

Correspondence

An Opinion on the Federal Emergency Relief Administration.

RICHMOND, VA.,
MARCH 15, 1934.

TO THE EDITOR:

Upon inquiry, I find that the Public Relations Committee of the Society did not hand in for publication the reports it presented in the House of Delegates at our last annual meeting, in regard to the Federal Emergency Relief Administration. Following the reading of the reports, however, a resolution was adopted disapproving of the plan proposed for the payment of physicians on a fee schedule basis for care of the indigent sick.

As I am opposed to the resolution, I wish to ask the following report presented by me to the Public Relations Committee on October 19, 1933, and known by the Committee as the "Minority Report," be published in the MONTHLY:

To the Members of the Public Relations Committee:

In my judgment the Medical Society of Virginia should cooperate with the Emergency Relief Fund Administration as has been adopted in the State of Kentucky. My reasons for this are as follows:

1. The situation is an emergency act, which may last for a year or longer, but it is still distinctly an emergency and not a permanent policy.

2. This act will, to my mind, be chiefly beneficial to general practitioners and particularly to the country practitioners who are probably most in need of some help because of the economic condition of the farmers. I was raised in the country and at the beginning of my professional career I practiced medicine in the country, and I can fully sympathize with the country general practitioners.

3. I see no reason why doctors cannot fully cooperate with the local relief organizations of the local medical associations, and at the same time accept from this Emergency Relief Fund, without necessarily the knowledge of the patient, some compensation for their services, whereas otherwise they would receive no compensation.

4. Diversion from this Fund to make up hospital deficits may diminish the amount of funds that would otherwise be distributed to the general practitioners over the country. If additional funds for the hospitals can also be obtained, it would be most desirable, provided this does not reduce the amount made available for the general practitioners. Deficits on account of services to charity patients may also be made up by local measures in each particular community. It seems obvious that, if other things are equal and a charity case can be treated at home about as effectively as at the hospital, the compensation for medical treatment of such cases at home would relieve the hospital of much of the financial burden of charity cases.

I would suggest that the Committee and the Delegates hear from Dr. Draper, the Health Commissioner of Virginia, and from Mr. Smith, who is the representative of the Emergency Relief Fund, before coming to a final conclusion.

That participation in this Emergency Relief Fund is considered advisable by the authorities of the American Medical Association is shown from the following extract from an editorial in the *Journal of the American Medical Association*, of September 23, 1933:

"According to a rule promulgated June 23rd, by the Federal Emergency Relief Administration, State emergency relief administrators must provide adequate medical service for persons on relief rolls. Money granted to the States from the Federal emergency relief fund may be used to pay for medical services and supplied for patients in their homes. All hospital expenses must be paid for from State or local funds. Federal money is not to be used to support existing medical, dental and nursing relief services, but only to augment those services. State and local relief agencies are expected to operate through agreements with the organized medical, dental and nursing professions, State and local. Within legal and economic limitations, the traditional relations between patients and their physicians, dentists and nurses are to be maintained. Professional services rendered patients on relief rolls must be of the same type as those rendered private patients and are to be paid for at agreed rates, due allowance being made for the observation of relief funds. The common aim, as stated by the administration, is the provision of good medical service at low cost, to the benefit of the indigent patient and the physician, nurse, dentist and taxpayer."

In my judgment, participation in this Relief Fund in such an emergency cannot be other than helpful to patients and to the medical profession.

Respectfully submitted,
J. SHELTON HORSLEY.

Public Health Statistics

WARREN F. DRAPER, M. D.
Health Commissioner of Virginia

Among the communicable diseases reported to the State Department of Health during March, 1934, were the following cases: Typhoid and paratyphoid, 13; Diphtheria, 121; Scarlet fever, 204; Measles, 6,911; Meningitis, 23; Poliomyelitis, 4.

The number of cases of typhoid and paratyphoid reported from the following counties were: Accomack, 2; Alleghany, 1; Buchanan, 1; Elizabeth City, 1; Lee, 3; Northampton, 1; Pittsylvania, 1; Scott, 1; Warren, 1; Washington, 1.

Epidemic Meningitis was reported from: Accomack, 1; Albemarle, 1; Brunswick, 1; Culpeper, 2; Dickenson, 3; Essex, 1; Floyd, 1; Fluvanna, 1; Giles, 2; Rockbridge, 1; Rockingham, 2; Russell, 2; Smyth, 1; Tazewell, 2; Warren, 1; Norfolk City, 1.

Diphtheria was scattered in 41 counties and 7 cities.

Scarlet fever was reported from 51 counties and 9 cities.

MEASLES. Many cases of measles continue to be reported weekly to the State Department of Health. During March, 1934, measles was reported from 82 counties and 9 cities with a total of 6,911 cases. Consistent with the tri-yearly cycle, 1934 is the year for an epidemic in Virginia. In 1928, there were 20,460 cases reported. In 1931, there were 17,974 cases. From January 1 to April 1, 1934, there have been 12,160 cases reported in Virginia with 1,618 cases during the week of March 17th. This disease has become quite pandemic. During the one week ending March 17, 1934, the U. S. Public Health Service reported 33,049 cases in 46 states.

Undoubtedly, many cases of measles are not reported due to the fact that they have not been seen by a physician and also due to continued lack of information on the part of many parents to the need of calling a physician. Parents do not realize that with measles, as with chickenpox, nearly 100 per cent of susceptible children exposed will develop the disease, and do not realize the danger of complications. During January and February, 1934, seventeen deaths occurred in Virginia as a result of measles.

Protection against measles may be secured if, during the first four or five days after exposure, an individual is inoculated with a sufficiently large dose of convalescent serum. This produces a passive and temporary protection which may last for two to five weeks and the attack of measles due to such exposure may be entirely prevented. However, it leaves the individual as susceptible to measles as before the injection. It is desirable that babies still in the first two years of life be given this complete protection.

When injected intramuscularly, five to six cubic centimeters of serum from a recently convalescent patient, bled from five to ten days after defervescence, will ordinarily protect a pre-school child and ten cubic centimeters will protect an older person. When the serum of an adult who had measles in childhood is used, two to three times this amount is necessary. Consequently, twenty to thirty cubic centimeters of parental whole blood injected deep into the buttocks may mitigate a case of measles and the child may suffer a mild case, but he thereby acquires active immunity against measles, which should last for life. The use of human serum is, to-date, the only recognized specific method of controlling outbreaks.

New Members

Since our annual meeting in Lynchburg, the following are names of new members who have been added to the roll of the Medical Society of Virginia:

Dr. J. Edward Amiss, New Market.
Dr. Harloe Bailey, Rural Retreat.
Dr. James P. Baker, Richmond.
Dr. Allen Barker, Petersburg.
Dr. Clifford H. Beach, Richmond.
Dr. L. Nelson Bell, Tsingkiangpu, China.
Dr. J. B. H. Bonner, Beaumont.
Dr. M. F. Brock, Norfolk.
Dr. H. C. Brownley, Lynchburg.
Dr. Mason B. Caldwell, Wytheville.
Dr. Paul D. Camp, Richmond.
Dr. Hawes Campbell, Jr., Hanover.
Dr. Alexander N. Chaffin, Galax.
Dr. John E. Collier, Richmond.
Dr. P. Q. Daniel, Deltaville.
Dr. Edwin F. Gouldman, Colonial Beach.
Dr. J. E. Haynsworth, Buckingham.
Dr. Joseph Horwitz, Richmond.
Dr. William R. Jordan, Richmond.
Dr. Charles F. Kincheloe, East Falls Church.
Dr. Alfred M. Palmer, Clarendon.
Dr. Minor B. Payne, St. Charles.
Dr. Richard M. Reynolds, Norfolk.
Dr. Edward B. Richey, Lynchburg.
Dr. Churchill Robertson, Roanoke.
Dr. Wade H. Saunders, Fincastle.
Dr. Ernest L. Stebbins, Richmond.
Dr. Clifton R. Titus, Bassetts.
Dr. Meyer Vitsky, Richmond.
Dr. Ennion Williams, Richmond.

Woman's Auxiliary, to the Medical Society of Va.

President—MRS. WILLIAM LETT HARRIS, 1112 Matoaka Street, Norfolk.

President-Elect—MRS. JOSEPH BEAR, 3012 Monument Avenue, Richmond.

Recording Secretary—MRS. FLETCHER J. WRIGHT, 49 South Market Street, Petersburg.

Corresponding Secretary—MRS. CHARLES A. SAUNDERS, 1000 Gates Avenue, Norfolk.

Treasurer—MRS. REUBEN F. SIMMS, 2034 Park Avenue, Richmond.

Reports from Auxiliaries.

NEWPORT NEWS AUXILIARY

The Newport News Auxiliary to the Warwick County Medical Society held its first annual meeting at the home of Mrs. W. S. Snead, the president, on March 7, 1934. We celebrated this meeting with a luncheon given in honor of Mrs. W. L. Harris, of Norfolk. Mrs. M. N. King, of Norfolk, was also present. A color note of green and yellow was carried out, even to the little individual "birthday cakes" with a single lighted candle.

We had a large number present, including some of the Doctor's wives, from Hampton, who have decided to combine with our Auxiliary but to work as a distinct group. This group will have Mrs. B. E. Hunt for president, and Mrs. J. J. Cullinan for vice-president.

We have worked under the four following groups during the past year: health lectures in the public schools; prenatal; cooperating with the visiting nurses' association; and cooperating with the Cosmopolitan Club in checking upon glasses for school children.

Since we organized, we have handled quite a number of prenatal cases, and have furnished nursing service and medical attention. We have also furnished layettes. In addition, we have started a linen chest containing three dozen sheets and three dozen pillow cases to be loaned to various patients.

At the meeting, Mrs. Harold Potter was elected president-elect, and Mrs. W. O. Poindexter, historian.

The meeting really was a delightful one.

MRS. C. B. COURTNEY,
Publicity Chairman.

JAMES CITY-NEW KENT AUXILIARY

The Woman's Auxiliary to the James City-New Kent Medical Society met at the home of Mrs. L. V. Henderson in Toano, Va., Monday, March 12, 1934.

It was decided there would be no election of new officers, the old ones remaining in office another year.

The program consisted of an article from *"Hygeia"* by Mrs. T. B. Henderson, of Williamsburg, the subject being "Full Speed Ahead, Kills". There was also an article taken from *"Time,"* by Mrs. A. M. Snead, of Toano, the subject being "Tularemia".

The meeting was adjourned and lovely refreshments were served by the hostess.

MRS. J. R. TUCKER, *President.*

RICHMOND ACADEMY OF MEDICINE AUXILIARY

The Auxiliary to the Richmond Academy of Medicine met at the Library Building on Friday, April 13th, at 3:30 P. M. The new president, Mrs. J. B. Stone, presided.

Plans were discussed for the raising of funds to assist in the Academy's new project, the establishment of a pathological museum. That finally decided upon was the sponsoring of a theatrical performance which will take place in May.

An honored guest at this meeting was Mrs. J. N. Hunsberger, of Norristown, Pa., a past president of the national organization. Mrs. Hunsberger gave a helpful and inspiring discussion of various phases of work which may be undertaken by local organizations.

Tea was served after the session which has been changed to the afternoon, with the hope that more members will find it convenient to attend and enjoy a social hour after the business session.

National Meeting.

The annual meeting of the Woman's Auxiliary to the American Medical Association is to be held in Cleveland, Ohio, June 11th to 14th. Mrs. James Blake, of Hopkins, Minn., is president, this year, and she and the local committee are doing everything possible to make this a banner meeting. The Carter Hotel has been selected as headquarters. This is located just two short blocks from the Statler, hotel headquarters for members of the A. M. A. Make your plans to attend and get the vision of this splendid group of women.

Truth About Medicine

In addition to the articles previously enumerated, the following have been accepted:

Hoffmann-La Roche, Inc.
Tablets Digalen—Roche, 1 Cat Unit

National Drug Co.
Scarlet Fever Streptococcus Toxin for the Dick Test (National), fifty test package.
Typhoid-Paratyphoid, a Vaccine, thirty 1 c.c. ampule-vials package.

Parke, Davis & Co.
Ortal Sodium
Capsules Ortal Sodium, 3 grains (0.2 Gm.)

Sheffield Farms Co., Inc.
Sheffield B. Acidophilus Milk.

John Wyeth & Brother, Inc.
Ampoule Solution Dextrose 25 Gm. in 50 c.c.
Ampoule Solution Dextrose 50 Gm. in 100 c.c.

Don Baxter Intravenous Products Corporation
Sterile 2½% Dextrose in Physiological Sodium Chloride Solution in Vacoliter Container.
Sterile 5% Dextrose in Physiological Sodium Chloride Solution in Vacoliter Container.
Sterile 7½% Dextrode in Physiological Sodium Chloride Solution in Vacoliter Container.
Sterile 10% Dextrose in Physiological Sodium Chloride Solution in Vacoliter Container.

Eli Lilly & Co.
Solution Liver Extract Concentrated—Lilly
Ampoules Solution Liver Extract Concentrated—Lilly, 10 c.c.

G. D. Searle & Co.
Tablets Procaine Borate Without Epinephrine.

Sharp & Dohme, Inc.
Antipneumococcic Serum, Types I and II Combined—Mulford.
Antipneumococcic Serum, Concentrated (Pneumococcus Anti-body Globulin, Types I and II—Mulford.
Diphtheria Toxoid, Alum Precipitated (Refined).
Live Oak Pollen Extract—Mulford; Red Clover Pollen Extract—Mulford; Sweet Clover Pollen Extract—Mulford; Southern Ragweed Pollen Extract—Mulford.

PROPAGANDA FOR REFORM

Hemp Massager Not Acceptable.—The Council on Physical Therapy reports that the Hemp Massager, manufactured by the Conley Company, Inc., Rochester, Minn., consists of two rubber balls mounted on spindles at right angles to each other. As this device is pulled along over the body, the rubber balls pinch the skin and by friction lift it and underlying superficial tissues above the contour of the body or limbs. The Council investigated this massager and declared that it did exactly what, in practicing good massage, a masseur tries to avoid; it pinches the superficial tissues instead of picking up and kneading deep tissues as well as the superficial. Even if the massager faithfully duplicated hand massage, there are certain statements in the advertising for which critical evidence is not available. The Council objected to the claims made for the relief of headache, nervousness and constipation. In reality, these conditions might be caused by some impaired function other than that for which massage is justly indicated. The Council regards the advertising as objectionable, because satisfactory evidence is not in its possession to substantiate the efficacy of massage with this unit in the conditions mentioned. It has declared the Hemp Massager ineligible for inclusion in its list of accepted devices. (Jour. A. M. A., February 10, 1934, p. 455.)

New Books at the Library of the Medical College of Virginia.

The following new books are available to our members, the only cost being return postage:

Anthony, L. P.—A Dictionary of Dental Science.
Bassett, Clara—Mental Hygiene in the Community.
Beeston, G. N.—The Conjoint Finals.
Bennett, H., ed.—The Chemical Formulary, 1933.
Blanchan, N.—Bird Neighbors.
Brain, W. R.—Diseases of the Nervous System.
Browne, E. G.—Arabian Medicine.
Camac, C. N. B.—Imhotep to Harvey.
Clark, A. J.—Applied Pharmacology.
Cold Spring Harbor—Symposium on Quantitative Biology, Vol. 1.
Cowdry, F. V., ed.—Arteriosclerosis. A survey of the problem.
Cockayne, E. A.—Inherited Abnormalities of the Skin and its Appendages.
Economo, C. von—Encephalitis Lethargica.
Fischl, V. & others—Handbook of Chemotherapy (Part 1 only).
Gellhorn—Das Permeabilitäts Problem.
Gibson, A. G.—The Physician's Art.
Gray, J.—Ciliary Movement.
Greenlaw, E. A.—Syllabus of English Literature.
Griffith & Mitchell—Diseases of Children.
Grosser, O. V.—Anatomie u Entwicklungsgeschichte der Eihaute und d. Placenta.
Hartman, C. G., and Straus, W. L.—The Anatomy of the Rhesus Monkey.
Hillyer, J.—Reluctantly Told.
Hume, E. D.—Bedamp or Pasteur.
Jacobson—Progressive Relaxation.
Lahmeyer, F., and Dorno, C.—Eine Meleorologisch-physikalische-physiologische Studie.
Metcalf, J. C.—American Literature.
Moore, J. E.—Modern Treatment of Syphilis.
Norris & Landis—Diseases of Chest and Physical Diagnosis (5th ed.)
Prausnitz, C.—The Teaching of Preventive Medicine in Europe.
Richters, C. E.—Die Tiere im Chemischen Kriege.
Schede, F.—Hygiene des Fusses.
Stephen, K.—Psychoanalysis and Medicine.
Stempell, W.—Die Unsichbare Strahlung der Lebewesen.
Thaysen, T. E. H.—Non-Tropical Sprue.
Westermarck—History of Human Marriage (3 vols.)

Book Announcements

Procedures in Tuberculosis Control for the Dispensary, Home and Sanatorium. By BENJAMIN GOLDBERG, M. D., F. A. C. P., F. A. P. H. A., Associate Professor of Medicine, University of Illinois, etc. With a chapter on **Sanatorium Planning,** by THOMAS B. KIDNER, New York, and an Introduction by DAVID J. DAVIS, M. D., Ph. D., Dean of the College of Medicine, University of Illinois. Octavo of 373 pages. Fifty-four illustrations. Philadelphia. F. A. Davis Company. 1933. Cloth. Price, $4.00 net.

This is a volume of about three hundred and seventy-five pages with a discussion of the tuberculosis problem under three sections.

First section—Evaluation and diagnosis of the tuberculosis problem.

Second section—Home treatment.

Third section—Sanatorium treatment.

Under section one, the subject is considered from the standpoint of tuberculosis control, the dispensary, together with legislation—enabling and coercive—including regulations and the methods used in cooperation with the private physician. Enforcement should not be used when other means can be found by which the consumptive in the communicable stage can be handled. The subject is also considered from the viewpoint of the open case, or the contacts, and the means used to remove the communicable patients so they will not be a source of danger. The method of handling these cases from the dispensary, together with the supplementary activities in the homes, and the preventorium treatment for children are considered as are also education and publicity, through all the channels which can be used to convey information about tuberculosis to the laity.

Under section two, home treatment is considered from the standpoint of the dispensary, not only by getting the patients to the dispensary for examination but by visits of the doctors and nurses to the patient's home. A survey is made of home conditions, and the necessity for arranging sleeping quarters, isolation, and contact with children is discussed. As there are not enough available beds in the sanatoria to take care of the tuberculous, it is recognized that many patients must have home treatment. It is stated though that the matter of bed capacity for the tuberculous in Chicago is well taken care of.

Under section three, the function of the sanatorium is discussed, together with the routine sanatorium treatment or service, with all the departments of the sanatorium, such as details of daily routine, surgery, diet, drugs, dental department, education of patients, together with recreation, and laboratory and research work.

The book takes up the tuberculosis problem somewhat in detail, so far as case-finding and diagnosis are concerned, the handling of the patient in the dispensary, the home treatment of the patient, and the sanatorium treatment of the patient. It is brought out clearly that the greatest problem in the prevention and control of tuberculosis, so far as the people as a whole are concerned, is that which is brought about chiefly by those unfortunates whom it is difficult to isolate and, also, for whom education is most important.

The hospitalization or sanatorium treatment of the tuberculous is recommended for the most part for those people who are ignorant of the dangers of contact, the means of spread of the disease, and for those of poor economic status. The book gives somewhat in detail the mortality and morbidity rates with reference to age, race, etc., and stresses the fact that most of the cases and deaths from tuberculosis come from the congested portions of the cities. Some plans for the building of institutions are given, and the thought is presented that while we cannot expect to eradicate tuberculosis entirely there is no reason why it should not be controlled to a minimum.

It is stated that measures which are suitable for the control of the disease in Chicago may not be the ones that may be used to best advantage in another city, or in the country districts. As a whole the tuberculosis problem is considered from the viewpoint of the large city. There is information throughout the book which is of help to those interested in tuberculosis prevention and control. It can be used as a reference book by anyone who wishes information about tuberculosis and the means to be used in the control, so far as case finding, diagnosis, methods of handling, home treatment, and sanatorium treatment are concerned.

XUM

Virginia Medical Monthly

Founded by LANDON B. EDWARDS, M. D., April, 1874
Owned by MEDICAL SOCIETY OF VIRGINIA since November, 1919
WYNDHAM B. BLANTON, M. D., *Editor*
AGNES V. EDWARDS, Richmond, *Business Manager*

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This journal is not responsible for the opinions and statements of its contributors.

All advertisements are received subject to the approval of the Council on Pharmacy and Chemistry of the American Medical Association.

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VOLUME 61 MAY, 1934 No. 2

Editorial

A New Medical Journal.

In 1800 there was only one medical journal in this country. A few years ago nearly one-half of the 1,654 medical journals published in the world were being issued on this side of the Atlantic. Many have questioned the wisdom of this enormous spread and dissipation of energy, devoutly wishing for a more concentrated output of superior material.

We have before us the first issue of a new medical publication—the *American Journal of Digestive Diseases and Nutrition.* This does not appear to be just another medical journal. For some time there have been useful special journals covering the various different though cognate fields of medical specialization—surgery, anatomy, obstetrics, dermatology and neuro-psychiatry, but in the words of the journal itself "there has not been available on the Western Hemisphere a monthly publication exclusively devoted to the printing of authoritative work in the broad fields of the digestive system and of nutrition. Contributions upon such subjects have been scattered through a score of magazines and, usually, without purpose, order or sequence. The interested investigator, clinician and general physician have found that it is a hopeless task adequately to keep familiar with so extensive and widely-dispersed a literature."

The *American Journal of Digestive Diseases and Nutrition,* under the editorship of Frank Smithies, of Chicago, and an imposing editorial council of wide geographic distribution, appears in pleasing format and with well written and timely articles of general as well as special interest. There appears to be no reason why such a journal should not succeed, and to this end we wish it well.

Quo Vadis?

For twenty-five centuries anatomy has been the *sine qua non* in medical education. There was a time when the chair of anatomy was the most prized in the universities and its incumbent dominated the medical faculty. No one can think of the anatomists of the past without a feeling of gratitude and reverence. From Galen to Vesalius to our own Oliver Wendell Holmes—Mundinus, Fallopius, Fabricius, Servetus, Eustachius, Highmore, Bidloo, Haller, Cheselden, the Hunters, the Monros—they have all ornamented medicine.

There was a time when anatomy dominated the medical course, when great attention was paid to it in every year of the curriculum, and when final examinations of students hinged largely upon it. Recently anatomy was limited to the first two of the four-year course, though it was still a stiff, respected and well-conducted subject. Again the anatomists gave ground and the course was pushed entirely into the first year. In these latter days we understand time can be found for the course

only in one semester of the first year. Anatomy indeed has fallen on evil days.

At whose feet are we to lay the blame? To the teachers of anatomy themselves? The anatomist confesses that his work is done, that the once fertile field of gross anatomy is exhausted—dissection, topography and morphology no longer offering new realms for conquest—and that the adventurer in science has had to turn to other related fields—anthropology, evolution and ethnology. If professors of anatomy have laid down the scalpel and fail to find anything of interest in human dissection are they different from the pre-Vesalians who perched on high seats lectured from the works of Galen while menial barber surgeons ignorantly dissected the subject before their students?

Perhaps the fault lies elsewhere—in our increasingly crowded curriculum, in the pressure and clamor for more and more clinical courses and an earlier practical bent in medical instruction. Before such pressure anatomy has had to retreat. Can it afford further retrenchment without the possibility of some day becoming entirely a pre-medical subject? There are those who believe that should this happen any clinical superstructure erected will rest upon a ground work of the fundamental sciences too weak to bear its load.

Too Many Doctors?

It is argued that in the United States today there are more physicians in proportion to the population than in any other country of the world. But who is willing to maintain that the proper proportion of doctors to population exists in any of the other countries and that only in our own country is the proportion wrong? Who knows what is the ideal proportion? It is argued that starvation fees and unemployment among doctors indicate a surplus of doctors. But who is willing to say that with fewer doctors and higher fees the great body of the American people who are now unable to meet doctors' bills would be any better off? Who maintains that fewer doctors means more adequate or cheaper medical service to those most in need of it? Admitting that the present distribution is bad—there is one physician to every 1,431 persons in South Carolina, one to every 621 in New York and one to every 571 in California—who will guarantee that with fewer physicians there would be any better distribution?

A New Treatment for Agranulocytosis?

A little over a year ago C. A. Doan in summarizing the various methods of treating agranulocytosis gave the mortality rates for the four most popular as: arsphenamin, 72 per cent; blood transfusion, 64 per cent; irradiation, 53 per cent, and neucleotide, 25 per cent. Recently Max Strumia (*Am. J. Med. Sci.*, April, 1934) reported favorably upon the intramuscular injection of "leukocytic cream" obtained by stratifying citrated blood in a Babcock cream bottle. It should be noted that leukocytic extract has been employed in agranulocytosis before and at least one favorable report is in the literature.

The Early Diagnosis of Coronary Disease.

When the electrocardiograph was first employed clinically it was welcomed as an exact method of diagnosis in many hitherto puzzling irregularities of the heart. We were soon told, however, that although the procedure had proved invaluable in elucidating the actual mechanism of the cardiac arrhythmias, in the long run clinical data is really sufficient in most cases for a diagnosis. The instrument then came to be looked upon by some as a toy of interest only to the cardiologist. Fortunately the idea of such limitation has been successfully dispelled by the demonstration of the increasing usefulness of the electrocardiograph in many other conditions of the heart, particularly in the early diagnosis of coronary disease. Only recently by this method Brow and Holman (*Am. Heart J.*, Dec., 1933, 9, 259), have demonstrated that the tracings obtained during an attack of angina pectoris, though transitory, are identical to those considered characteristic of coronary occlusion.

In the further study of coronary disease, in addition to the evidence to be deduced from changes in the T wave and the Q-R-S complex—reduced amplitude and the Pardee curve—our attention was called by Wolferth and Wood in 1932 to additional evidence to be found in a IVth or chest lead, and lately Katz and Kissin (*Am. Heart J.*, 1933, 8, 595), and others have emphasized the significance of alterations in the Q_3 wave. The seriousness of these latter changes has not been universally accepted, but while the cardiologists are contending over the question, those who deal with coronary disease at the bedside and in the office will do well to continue to lay stress upon the patient's story

and will make the diagnosis of acute indigestion in middle aged and elderly people rarely and with extreme caution.

Sickness Insurance in This Country.

The layman's point of view on this important question may be gathered from a recent address by John A. Kingsbury, Secretary of the Milbank Memorial Fund, before the annual convention of the Western Hospital Association and Conference with Allied Organizations meeting in Sacramento, Calif. A Senate Committee on Investigation of the High Cost of Sickness, already at work in California, speaks for the popular interest in the problem in the West.

Mr. Kingsbury, undertaking to formulate a program, states that (1) "sickness insurance should apply to all families with annual incomes of less than $3,000 or $5,000. . . . We want no poor-man's system in America." (2) "It must be grounded on a compulsory basis." (3) Provision must be made for both "mandatory" and "permissive" service. (4) "The general practitioner can be paid a sum equivalent to at least $7.50 per insured person." (5) "The basic problem is not to find more money than is now spent, but to find new and better ways of directing customary expenditures into more productive channels." (6) The funds are to be raised through taxes, contributions of the insured and employers of labor. (7) Finally, provision must be made for "lay supervision of financial and executive problems" and "professional supervision of professional personnel and professional problems."

Department of Clinical Education of the Medical Society of Virginia

Post-Graduate Clinics at University Hospital.

The regular spring post-graduate clinic of the University of Virginia Hospital is scheduled for Thursday and Friday, May 17th and 18th. This program is the thirteenth in the series which was established by the demand of physicians and has been maintained by the regular attendance of a loyal band from near and far.

Opportunity will be afforded for visiting physicians to observe the routine handling of out-patient cases by members of the newly organized Tumor Clinic. The usual round-table discussion of topics submitted by guests will be repeated at the evening meeting on Thursday. The program of clinics is as follows:

Thursday morning—Emergency Treatment of Fractures. Head and Chest—Dr. E. P. Lehman.
Spine, Pelvis and Extremities—Dr. R. V. Funsten.
Thursday afternoon—Routine Tumor Clinic in Out-Patient Department.
Thursday evening—Open Discussion.
Friday morning—Public Health Phases of Communicable Diseases—Dr. K. F. Maxcy.
Treatment of Communicable Diseases—Dr. W. W. Waddell.
Management of Hay Fever—Dr. Oscar Swineford, Jr.
Friday afternoon—Problem Child Clinic—Dr. D. C. Wilson.
The Problem of the Physician and Advances in Medicine—Dr. J. C. Flippin.

Ninth Circuit of Classes in Prenatal and Postnatal Care.

Several new members and visitors attending the meetings of the five courses in prenatal and postnatal care in the northern part of the Valley of Virginia have brought to a total of forty-eight the number of physicians who have taken some part in these courses during their first three weeks. The following names are to be added to the rolls previously reported:

HARRISONBURG: Visitors—Drs. J. M. Biedler and N. M. Canter.

LURAY: New enrollments—Drs. J. E. Amiss, B. C. Shuler and J. J. Waff. Visitor—Dr. Loring Hammer.

FRONT ROYAL: Visitor—Dr. J. G. Brown.

WOODSTOCK: Visitors—Drs. A. C. Biller, F. D. Downey, D. O. Foley, R. C. Fravel.

WINCHESTER: Visitor—Dr. R. McC. Glass.

Plans for the Future.

At the close of the ninth circuit, seventeen weeks of the employment of Dr. M. E. Lapham, Field Clinician of the Joint Committee on Prenatal and Postnatal Instruction, remain until the end of this program. The period permits the organization of a tenth circuit and additional shorter courses in the sections of northeastern Virginia which Dr. Lapham has not yet visited.

An application for one of these courses has been made by members of the Fairfax County Medical Society through Dr. A. L. Carson, Secretary, with the following advance enrollments: Drs. F. I. Bloise, A. L. Carson, W. P. Caton, R. E. Feagans, C. F. Kincheloe, William Meyer, Sigmund Newman, B. F. Phillips, E. C. Shull.

Some Statistics.

The tabulation of members and attendance for the eighth circuit of Dr. Lapham's classes on the Peninsula is given below. The figures are in many ways a repetition of previous circuits. One center of instruction proved to have been inconveniently located, and the rate of attendance there was the lowest yet recorded. There was, consequently, a slight drop in the rate for the circuit as a whole.

	Enrolled		Visitors		Attendance	
	No.	Present	No.	Present	Average	Per Cent
Richmond (Col.)	14	111	2	4	11.5	79.2
Richmond	9	48	14	60	10.8	53.3
Williamsburg	9	63	4	4	6.7	70.0
Newport News	8	65	2	6	7.1	81.2
Newport News, (Col.)	10	84	1	2	8.6	84.0
Hampton	10	76	--	--	7.6	76.0
	60	447	23	76	52.3	74.5

A summary compiled on March 23rd of the forty-five courses conducted in prenatal and postnatal care during a year and eleven months shows the following totals: Membership 554, visitors 250, fees paid $2,491. The average attendance in the classes was 10.7. The percentage of attendance for members was 76.2. The membership was divided into 319 physicians residing in the centers of instruction and 235 residing outside. Cases demonstrated before the groups numbered 291, and instructional consultations in the office of individual physicians reached a total of 551.

GEO. W. EUTSLER,
Secretary Joint Commitee,
Executive Secretary Department
of Clinical Education.

Proceedings of Societies

The Fauquier County Medical Society

Met on March 6th at the home of Dr. J. Elwood Knight, in Warrenton, Va. This was a business meeting for doctors only. The president, Dr. John T. Sprague called the meeting to order at 9 P. M. After reading of minutes of the last meeting, the secretary read a large number of letters from legislators and medical societies, indicating marked sympathy with and support of the resolutions for the benefit of physicians adopted by this Society. By a unanimous vote our Society expressed its thanks and appreciation to these friends and supporters and instructed the secretary to inform each of them of this action.

The secretary then read a letter, signed by Wm. A. Smith, Administrator, Civil Works Administration of Virginia and Wm. M. Myers, State Safety Director, Civil Works Administration, proposing a plan for the physical examination of C. W. A. employees in Virginia. This was discussed at much length by a large majority of the physicians present. Special references were made to possible claims for compensation from C. W. A. employees, and the great embarrassment this might cause the government.

The main points brought out were as follows: The Army, Navy, Marine Corps and other government services give their applicants a very careful examination by an experienced examiner before they are accepted. On discharge this examination is repeated. Both examinations are permanently recorded in great detail. This is the only proper way to handle any government employees. Even with this thorough method the United States Treasury has had a very hard burden to carry. Any method less rigid than the one indicated above might prove

most disastrous to the Treasury and to the taxpayers. The C. W. A. employees should have been handled in this manner. An examination given to one of these men now, even though thorough, would not prove what his condition was on the day he was employed and could not establish what his condition will be when he is discharged at some future date. Therefore an examination given now would not protect the government and would not be just to the employee.

The C. W. A. suggested that from four to six of the examinations could be completed in an hour. This would allow from ten to fifteen minutes for each examination. Our Society felt that an examination done in so short a length of time might prove most unfair to all parties concerned and be much worse than no examination at all. An examination to protect the Government should be as rigid an examination as one to protect a life insurance company, and it would be a very serious proposition for our members to do these examinations at the wrong time and in an inefficient manner. Doctors doing these examinations may be called on for information and testimony as long as any C. W. A. employees are alive; that is for the next forty or fifty years. Some thought that it might be possible that some one had already left a Treasury door or vault open and that this might invite many unwarranted claims for many years to come and that the physicians could not at this time, by a short, inefficient examination save the Government from claims amounting to untold millions in compensation.

The C. W. A. in Washington referred to these examinations as physical appraisals; a little more than inspection. Such a procedure could be of little or no value in protecting the Government against fraudulent claims and might be very unfair to men with just claims. It appeared that this might develop into a case of the physicians "holding the bag," that it might be a pretty bad bag to hold and that it would have to be held for a lifetime.

All present felt that it might be very unjust to our fellow citizens, employees of the C. W. A., and unfair to the Government at this time to do these examinations in the manner suggested. By a unanimous vote the society decided that it would not endorse the plan of physical examinations which had been offered by the C. W. A.

It was made clear that the physicians present would gladly serve the Government or the C. W. A. employees free of charge, when such action was necessary and would work for the public good.

Following adjournment, a delicious supper was served by Dr. and Mrs. Knight.

M. B. HIDEN, *Secretary.*

The Norfolk County Medical Society

Held its annual All-Day Clinic on Wednesday, April 11th. This annual clinic has come to be very highly regarded by many of the physicians from the adjacent territory as well as by those resident in Norfolk and Portsmouth. The attendance this year was large and the program interesting and instructive. The morning session was held in St. Vincent's Hospital, then after a most appetizing luncheon served by the management of the Protestant Hospital, the afternoon session was held in that institution. Despite a severe hail storm that came on shortly after seven, the proceedings were brought to a most enjoyable close by a lecture on "The Symptoms, Diagnosis and Treatment of Cancer of the Gastro-Intestinal Tract, by Dr. J. Shelton Horsley, of Richmond.

The papers and discussions throughout the day were of deep interest; dealing not so much with unusual and infrequently met conditions, but more with every day problems confronting the average doctor, they were of high order and greatly appreciated.

A feature that meets approval is that from the inception of these clinics it has been the invariable rule to run the program strictly on scheduled time, so that no time is wasted and no speaker is permitted to encroach on another's time. With the exception of Dr. Horsley's lecture, the entire program was furnished by the following members of the Norfolk County Medical Society:

Drs. Raymond Kimbrough, Julian L. Rawls, Walter B. Martin, B. E. Harrell, Joseph D. Collins, R. L. Payne, J. Warren White, Charles W. Doughtie, L. A. McAlpine, W. P. McDowell, C. J. Andrews, C. Lydon Harrell, Lomax Gwathmey, F. C. Rinker, Foy Vann, and Stanley H. Graves.

Among the distinguished guests of the Society in recent weeks may be mentioned Dr. Wilburt Cornell Davison, of Duke University, who spoke on "Lung Abscesses and Brucella Infection"; Dr. Clifford B. Lull, Chief of Clinic at Philadelphia

Lying-in Hospital, who furnished a most interesting account of "Obstetrics as seen by the Motion Picture Camera"; and Dr. Guy Le Roy Hunner, of Baltimore, who discussed "Certain Symptoms of Urinary Tract Origin which are often Diagnosed and Treated as of other Genesis."

While the great majority of the papers presented at the weekly meetings are from members of the Society, occasional visits from men of prominence in other fields are interesting and instructive.

L. B. SCOTT, *Secretary.*

The Northampton County Medical Society

Met at the Eastville Inn, on March 4th, for its quarterly dinner and scientific session. Dr. W. T. Green and Dr. W. C. Henderson, both of Nassawadox, are president and secretary, respectively.

Mr. A. A. Shank, director of the Nassawadox Branch of the State Laboratory, reported on some original research on Typhoid. By making cultures and counts of organisms in varying amounts of blood he was able to predict with great accuracy on the progress of the disease.

The Physicians' Journal Club

Held a reorganization meeting at the Northampton-Accomack Memorial Hospital, Nassawadox, Va., March 20, 1934. Dr. H. L. Denoon of that place reported on eleven cases of Ectopic Pregnancy taken from the files of the hospital. Dr. J. R. Hamilton, also of Nassawadox, presented an abstract on Circulatory Failure taken from Warfield's article in the February, 1934, *Archives of Internal Medicine.*

Dr. S. K. Ames, of Cape Charles, is president of this organization which meets monthly, and is composed of the physicians in the counties of Accomack and Northampton. Dr. W. Carey Henderson, of Nassawadox, is secretary.

News Notes

Reappointed on State Board of Medical Examiners.

Governor Peery has reappointed the following, nominated by the Medical Society of Virginia, as members of the State Board of Medical Examiners for a term of four years, expiring April 1, 1938:

Dr. R. D. Bates, Newtown.
Dr. P. St. L. Moncure, Norfolk.
Dr. H. U. Stephenson, Richmond.
Dr. Fletcher J. Wright, Petersburg.
Dr. I. C. Harrison, Danville.
Dr. J. W. Preston, Roanoke.
Dr. P. W. Boyd, Winchester.
Dr. Lewis Holladay, Orange.
Dr. F. H. Smith, Abingdon.

The Virginia Society of Oto-Laryngology and Ophthalmology

Will hold its annual meeting in Lynchburg, on May 5th, with the president, Dr. H. Grant Preston, of Harrisonburg, presiding.

The invited guest speakers will be Dr. S. J. Crowe, Baltimore, and Dr. John H. Dunnington, New York. Others on the program are Dr. Karl S. Blackwell, Richmond; Dr. E. G. Gill, Roanoke; Dr. C. A. Young, Roanoke; Dr. Cuthbert Tunstall, Charlottesville; Dr. R. H. Courtney, Richmond; Dr. H. S Hedges, Charlottesville; and Dr M. H. Hood, Portsmouth.

Dr. Edwin W. Burton, Charlottesville, is secretory of this Society.

National Fraternity for Medical Women.

The biennial convention of Alpha Epsilon Iota, National Fraternity for Medical Women, will be held at the Academy of Medicine Building, Richmond, Va., May 31st to June 2nd, inclusive, with Pi Chapter of the Medical College of Virginia as hostess.

This organization owes its inception to three senior and two junior women medical students at the University of Michigan, Ann Arbor, and was founded in 1890. Since that time its membership has increased to approximately 1,700, with chapters in most of the Class A Medical Schools which admit women. In addition to the University of Michigan, there are chapters at Rush (Chicago), the Universities of Cincinnati, Illinois, Minnesota, Leland Stanford, Cornell, Women's Medical of Philadelphia, Universities of California, Southern California, Syracuse, Tulane, Oklahoma, Oregon, Kansas, Texas, Ohio State, Wisconsin, Baylor (Texas), George Washington (Washington, D. C), Washing-

XUM

ton University of Missouri, and the Medical College of Virginia.

The local Chapter was formed in 1923 and still numbers among its members four out of the five applicants for the Charter, Drs. Mary B. Baughman, Lucy Scott Hill, Rachel Fletcther Weems, and Leta J. White. The highest honor which the Fraternity has to bestow was accorded Dr. Pauline Williams, who was National President, 1929-32 and who is at present Grand Council Chairman. Drs. Louise Fry Galvin and Mary Elizabeth Johnston have been Grand Chapter Secretaries.

The Committee in charge of local arrangements is as follows:

Dr. Mary B. Baughman, President Pi, General Chairman.
Miss Mildred Foreman, Vice-President, Entertainment.
Dr. Mary Elizabeth Johnston, Secretary-Treasurer Pi, Credentials.
Miss Esta Levy, Recording Secretary, Delegates.
Dr. Pauline Williams, Permanent Archivist, Housing.
Dr. Regena Cook Beck, Publicity.
Miss Dorothy Clark, Transportation.
Miss Aurelia Gill, Sight Seeing.
Dr. Louise Fry Galvin, Meals.
Miss Frances Noblin, Program.

In addition to the Executive Board Sessions on Thursday, and the General Sessions on Thursday night, and Friday and Saturday, with the usual breakfasts, luncheons, and dinners, there will be sight-seeing trips in and around Richmond and neighboring places, culminating in a trip to Williamsburg on Saturday afternoon.

About fifty delegates are expected.

Married.

Dr. James Asa Shield and Miss Frances Richardson, both of Richmond, Va., April 14th.

Dr. Herman Stuart Fletcher and Miss Helen Louise Overmann, both of Richmond, Va., April 4th.

Dr. Fred T. Hauser, class of '33, Medical College of Virginia, recently interning at Memorial Hospital, Richmond, and Miss Juanita Shannon, of the Training School at Memorial Hospital, February 22nd. They have located at Bland, Va., where Dr. Hauser is engaged in general practice.

Dr. Frederick Pilcher, Jr., Rochester, Minn., class of '29, University of Virginia, Department of Medicine, and Miss Marjorie McGuire, Petersburg, Va., March 24th.

Dr. Wyatt Earle Roye, class of '31, Medical College of Virginia, and Miss Anne Estelle Taylor, Bowler's Wharf, Va., March 22nd. They will make their home in Burkeville, Va.

Dr. Allen W. Lane, class of '32, Medical College of Virginia, and Miss Frances Barrow, Blackstone, Va., April 7th. They will make their home in Blackstone, where Dr. Lane is medical director of the Blackstone Transient Camp.

American Medical Association.

The eighty-fifth annual session of the Association will be held in Cleveland, Ohio, June 11th to 15th. The House of Delegates will convene on Monday, the 11th, and the Scientic Assembly will open with the general meeting on Tuesday evening, the 12th, at 8:30 P. M. Dr. Dean Lewis, Baltimore, is president. The Statler is to be headquarters hotel. A large attendance is expected and the meeting promises to be excellent in every detail.

American Medical Golfers to Play in Cleveland.

The American Medical Golfing Association will hold its twentieth annual tournament at the Mayfield Couutry Club in Cleveland on Monday, June 11th. Thirty-six holes of golf will be played in competition for the fifty trophies and prizes in the eight events.

The Association was organized in 1915 and now totals 1,100 members, representing every state in the union. All male Fellows of the American Medical Association are eligible and cordially invited to become members of the A. M. G. A. Write the executive secretary, Bill Burns, 4421 Woodward Avenue, Detroit, for an application blank. Participants in the tournament are required to furnish their home club handicap, signed by the secretary. No handicap over 25 is allowed, except in the Kickers'. No trophy is awarded a Fellow who is absent from the annual dinner.

Return from South America.

Dr. Joseph A. White and Dr. and Mrs. Emory Hill, Richmond, Va., returned home about the middle of April, after a cruise to West Indies and South America, while attending the fifth congress of the Pan American Medical Association. This was a Floating Congress, under the presidency of Dr. John O. McReynolds, of Dallas, Texas. Both Drs. White and Hill gave talks and discussed a number of papers in the section in which they were

especially interested. They report a pleasant vacation and pleasure in meeting with several graduates from Virginia schools, now located in foreign countries.

Dr. George H. Long,

Luray, Va., has accepted an appointment on Page County Health Board, succeeding Dr. Virgil Hammer, who resigned recently after having served for more than a score of years.

Dr. Dudley C. Ashton,

Who has been practicing in Richmond, Va., for the past six years, has moved to Beckley, W. Va., where he is associated with the Beckley Hospital.

American College of Physicians.

At the annual meeting of the American College of Physicians held in Chicago the middle of April, Dr. J. C. Meakens, Montreal, Canada, succeeded to the presidency, and Dr. James Alexander Miller, New York, was named president-elect.

West Virginia State Medical Association.

The annual meeting of this Association will be held in Huntington, W. Va., May 14th-16th, under the presidency of Dr. Roy Ben Miller, Parkersburg, and the program will be up to its usual high standard. Mr. Joe W. Savage, Charleston, is executive secretary of the Association.

Dr. Frederick L. Finch,

Class of '32, Medical College of Virginia, has located at Urbanna, Va., for the general practice of medicine.

Virginia Tuberculosis Association.

Representatives of thirty-two county and twelve city tuberculosis organizations attended the annual meeting of the Virginia Tuberculosis Association, held at Richmond on April 5th.

"Tuberculosis in Children" was discussed by Dr. Frank B. Stafford, of Blue Ridge Sanatorium, and Dr. Franklin D. Wilson, of Norfolk, following which Mrs. Rufus Parks, President of the Princess Anne County Tuberculosis Association, Miss Elsie E. Dyer, Executive Secretary of the Roanoke Tuberculosis Association and Miss Margaret S. Vaughan, Public Health Nurse of James City County, described tuberculin and X-ray work done by local physicians and sponsored by their respective tuberculosis organizations.

"Tuberculosis in the Negro" was the subject of addresses by Dr. C. Howard Marcy, of Pittsburgh, and Dr. Charles W. Scott, of Hampton. Dr. Scott was formerly Tuberculosis Clinician for the State Department of Health.

Dr. Marcy, who is President of the Pennsylvania Tuberculosis Society and Medical Director of the Tuberculosis League of Pittsburgh, is also Assistant Professor of Medicine at the University of Pittsburgh, and a member of the special committee appointed by the National Tuberculosis Association to study tuberculosis in the Negro.

It was pointed out that while the Negro is particularly susceptible to tuberculosis, as the bacillus spreads more rapidly and causes a more acute form of the disease in this race, sociological factors are of even greater significance in studying tuberculosis in this group. Poor housing, overcrowding, lack of segregation, poor sanitation and unbalanced diet were found by a recent survey in Pittsburgh to play an important part in making the death rate from tuberculosis from four to five times as great in the Negro as in the white race. The importance of better training for colored doctors and the employment of colored nurses was stressed, because they could reach their people in a way white doctors and nurses cannot do. In mentioning advantages of a tuberculosis survey, it was stated that 515 cases of tuberculosis were found in Pittsburgh where only 100 had been previously known. It was stated that tuberculin testing is an invaluable aid to the physician, but futile unless the open case of tuberculosis is cared for.

Dr. Thomas Hunnicutt

Has located in Medical Arts Building, Newport News, Va., and is engaged in the general practice of medicine. He was graduated from the Medical College of Virginia in 1929, following which he interned at Memorial Hospital, Richmond. Later, he had a residency at the Boston City Hospital and was a member of the medical staff of the Boston Dispensary from 1931 to 1933.

Dr. A. Wells Lowman,

Located for several years at Stonega, Va., recently moved to Denmark, S. C.

Dr. Frederick P. Fletcher

Was elected president of the East End Business Men's Association of Richmond, Va., at its annual meeting held in April.

XUM

Dr. Charles A. Young,

Roanoke, Va., leaves on May the 11th to take the Interstate Post-Graduate course again this year. The doctors will attend clinics in Spain, Italy, Switzerland and Germany. Dr. Young expects to be back in his office on July 5th.

Dr. H. G. Byrd,

Class of '32, Medical College of Virginia, has located at Louisa, Va., where he is engaged in general practice.

News from University of Virginia, Department of Medicine.

At the meeting of the University of Virginia Medical Society on March 26th, Dr. Dean Lewis, Professor of Surgery at the Johns Hopkins Medical School, spoke on the subject of The Hypophysis, Relation of Clinical Syndromes to Cellular Changes; at the meeting on April 9th, Dr. Alexander Randall, Professor of Urology at the University of Pennsylvania, spoke on The Obstructive Uropathies; on April 16th, Dr. A. R. Shands, Jr., Professor of Orthopedic Surgery at Duke University, spoke on Studies in Bone Formation, with Special Reference to the Use of Calcium Salts.

On March 29th, Dr. H. B. Mulholland spoke before the Bath-Alleghany County Medical Society on Newer Treatment of Diabetes Mellitus.

Dr. George Y. Dunlop, of the Department of Surgery, Cornell University, visited the Medical School on April 7th.

On the night of April 12th, following the annual initiation ceremony of the Alpha of Virginia Chapter of Alpha Omega Alpha, Dr. Edwards A. Park, Professor of Pediatrics at Johns Hopkins University, gave an address on the subject of Clinical Manifestations of Vitamin C Deficiency.

Medical College of Virginia News Notes.

The commencement exercises of the Medical College of Virginia will be held on the night of May 29th at eight o'clock in the auditorium of the Mosque at which time the address will be made by Dr. Francis Pendleton Gaines, President, Washington and Lee University.

The commencement sermon will be preached by Dr. Churchill J. Gibson, Rector, Saint James Episcopal Church, on Sunday, May 27th.

It is expected there will be about one hundred and eighty-seven graduates from the four schools, medicine, dentistry, pharmacy and nursing.

Dr. Frank L. Apperly, Dr. H. B. Haag, and Dr. R. J. Main attended the annual meeting of the associations of biological chemists, experimental pathologists, physiologists, and pharmacologists in New York, March 29th-31st.

Dr. E. H. Ingersoll and Mr. T. W. Andersen attended the annual meeting of the American Association of Anatomists in Philadelphia the latter part of March.

Recent visitors to the college were Dr. Seth Gayle, '27, of Scottfield, Ill.; Dr. C. B. Bowyer, '06, Stonega, Va.; Dr. C. V. Hollowell, '28, and Dr. E. V. Tucker, '30, of Goldsboro, N. C; Mr. A. W. Armour, of the General Education Board, New York, and Dr. Blanton P. Seward, '22, Roanoke, Va.

The regular meeting of the faculty and staff was held Thursday, April 12th. The following program was presented:

Chemical Burn of the Cornea in the New Born, by Dr. S. Trattner.

Urinary Studies in Arthritis and Other Conditions, by Dr. J. C. Forbes and Mr. R. C. Neale.

The monthly report for the outpatient department shows 5,626 visits for the month of March.

Dr. Alfred R. Shands, Jr., professor of orthopedic surgery at Duke University lectured to the upper classmen recently.

News Notes from the Duke University School of Medicine and Duke Hospital.

On April 6th, Dr. W. S. Rankin, Director of the Hospital Division of the Duke Endowment, lectured in the hospital amphitheatre on The State and the Practice of Medicine.

On April 16th, Mr. Vilhjalmur Stefanssom, explorer, lecturer, and author, gave a lecture on Arctic Dietetics.

On April 17th, Dr. Adolph H. Schultz, Associate Professor of Physical Anthropology at The Johns Hopkins University School of Medicine, addressed the Duke Chapter of Sigma Xi on the subject of Man as a Primate.

During the winter quarter the following seniors were elected to Alpha Omega Alpha fraternity: Earl W. Brian, Richard Z. Query, Jr., and Charles T. Wood.

Dr. W. H. Hale,

Who for the past three years has been operating a clinic in Bland, Va., has recently located in the Shumate Building, Pearisburg, Va., where he formerly practiced.

Dr. C. W. Trexler,

Class of '26, University of Virginia, Department of Medicine, for the past two years associated with the Mid-Pacific Clinic at Honolulu, Hawaii, opened offices on March 15th in 65 Alexander Young Building, that city. He took over the office and equipment of the late Dr. R. H. Hagood, and will limit his practice to diseases of the eye, ear, nose and throat.

The American Association for the Study of Goiter

Will hold its annual meeting in Cleveland, Ohio, June 7th-9th, under the presidency of Dr. R. M. Howard, of Oklahoma City, Okla. This meeting just precedes that of the American Medical Association and the program includes the names of a number of well-known men in the United States and Canada interested in the subject of goiter. For further information, write Dr. J. R. Yung, corresponding secretary, Terre Haute, Ind.

Dr. W. Ambrose McGee,

Richmond, Va., has been elected president of the Alpha Alumni Chapter of the Pi Kappa Alpha national fraternity, recently re-organized in this city.

Dr. H. Cowles Rucker,

Mattaox, Va., was elected president of the Amelia Golf Club, at its annual meeting held in April. The Amelia Club is one of the charter members of the Southside Virginia Amateur Golf Association, composed of ten clubs.

Dr. M. F. Brock,

Who graduated from the Medical College of Virginia in 1930, is now superintendent of the Norfolk, Va., Welfare Center and physician-in-charge of the Grandy Sanatorium, a unit of the Center. Dr. Brock interned at St. Vincent's Hospital, Norfolk.

Southeastern Surgical Congress.

Dr. Gerry R. Holden, Jacksonville, Fla., succeeded to the presidency of this association at its annual meeting held in Nashville, Tenn., recently. At this time, Dr. Wiliam D. Haggard, of Nashville was chosen president-elect. Dr. B. T. Beasley, Atlanta, Ga., was re-elected secretary. It was voted to hold the 1935 session in Jacksonville, Fla.

Dr. Paul L. Dent,

Of the class of '31, Medical College of Virginia, announces that he has opened offices at Point Pleasant, W. Va., where he will be engaged in general practice.

Dr. Henry E. Davis,

Williamsburg, Va., has been appointed a member of the School Board of that city, to fill the vacancy caused by the resignation of Dr. W. L. L. Smoot.

Dr. James W. Reed

Has been elected a member of the City Council of Norfolk, Va., to fill the unexpired term of Mr. S. L. Slover, resigned. With the exception of a three-year term as health officer of Norfolk County this is Dr. Reed's first experience in public office. He has, however, been quite active in all efforts for the advancement of the Ocean View section, whose interests he will especially represent.

Dr. M. B. Payne,

Class of '29, University of Virginia, Department of Medicine, for several years of St. Charles, Va., has recently accepted a position as physician and surgeon for the Blue Diamond Coal Company, and is now located at Blue Diamond, Ky.

Dr. Charles F. Kincheloe

Is located at East Falls Church, Va., where he is engaged in general practice. He is a graduate of the University of Virginia, class of '31, and served internships at Charity Hospital, New Orleans, La., and St. Luke's Hospital, Bethlehem, Pa., before locating for private work.

The Bulletin of the American Society for the Control of Cancer

Contains short, practical, articles written by distinguished authorities in the field of cancer therapy

and cancer research. A complimentary copy of the *Bulletin* will be gladly sent to any physician requesting it from the American Society for the Control of Cancer, 1250 Sixth Avenue, New York City. It offers, at the subscription price of only $1.00 a year, an easy and practical way for the physician to keep abreast of cancer control progress, and contains much educational matter that is interesting not only to the medical profession but to the laymen.

Venereal Disease Information.

For a number of years the U. S. Public Health Service has been publishing, for the information of physicians, health officers, and others, a monthly abstract journal known as *"Veneral Disease Information."* This publication contains usually one original article on a subject of general interest in connection with the venereal diseases and numerous abstracts from the current literature pertaining to these diseases. In the preparation of this abstract journal more than 350 of the leading medical journals of the world are reviewed and abstracts made of the articles on this subject.

The cost of *"Veneral Disease Information"* is only fifty cents per annum, payable in advance to the Superintendent of Documents, Goverment Printing Office, Washington, D. C. It is desired to remind the reader that this nominal charge represents only a very small portion of the total expense of preparation, the journal being a contribution of the Public Health Service in its program with State and local health departments directed against the venereal diseases.

Obituary Record

Dr. Albert Asa Cannaday,

Roanoke, Va., died February 22nd, of Ludwig's angina. He was born in 1863 and graduated from the New York University Medical College in 1888. Dr. Cannaday has been a member of the Medical Society of Virginia for a number of years.

Dr. Calvin Hawthorne Childress,

Lieutenant-Commander and medical officer in the Naval Reserve Fleet Division Five, stationed at Norfolk, Va., died suddenly April 1st, following a heart attack. He was on board ship, returning from a visit to New York, and was found dead by a friend who went to meet him. Dr. Childress was a native of Richmond, Va., and was 43 years of age. He graduated from the Medical College of Virginia in 1915. Dr. Childress had been a member of the Medical Society of Virginia for some years. His wife and three children survive him.

Dr. James T. Jarrett,

Roanoke, Va., died April 1st. He was 63 years of age and a graduate of the former University College of Medicine, Richmond, Va., in 1898. His wife and three children survive him.

Dr. Charles Lee Quaintance,

Died April 13th in New York City. He was formerly a resident of Charlottesville, Va., but had been located for practice at Queen's Village, Long Island, in recent years. Dr. Quaintance was 39 years of age and graduated from the University of Virginia, Department of Medicine, in 1921. His wife and two children survive him.

Dr. Hanson Slaven Ogilvie,

Asheville, N. C., died March 22nd. He was 50 years of age and graduated from the Medical College of Virginia, class of '09. Dr. Ogilvie specialized in psychiatry and was located in New York before going to Asheville.

Dr. George Norfleet Harrell,

Grimesland, N. C., died February 16th. He was 52 years of age and a graduate of the former University College of Medicine, Richmond, Va., in 1907.

Dr. James Dallas Kirk,

Roanoke, Va., died December 22, 1933, of pneumonia. He was 87 years years of age and graduated from the Long Island College Hospital, Brooklyn, in 1870.

Dr. Elijah Emery Rose,

Ewing, Va., died December 27, 1933. He was 80 years of age.

Mr. E. Mead Johnson.

It is with regret we announce the death on March the 20th, of Mr. E. Mead Johnson, president of Mead Johnson and Company of Evansville, Ind.